

ENERGETIC INVESTMENT IN THE ACROPOLIS AT YALBAC, BELIZE
A COMPARATIVE APPROACH

BY

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ABSTRACT

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This thesis presents the results of investigations made into eight looter's trenches penetrating a monumental structure known as the Acropolis at the Maya site of Yalbac, Belize. The results of these investigations are used to analyze the amount of human labor invested in various aspects of the construction of the structure. The figures generated by this analysis are used to draw comparisons between energetic investment at Yalbac and similar investment at the major Maya sites of Copán and Tikal. Based on this comparison, some possibilities are postulated regarding the differences in political power among the elites of the three sites, and regarding the position of Yalbac in Maya political history.

Energetic investment in monumental architecture, in terms of labor consumed in construction, is an important measurement of political power. Private residential structures, in particular, represent the varying abilities of their inhabitants to command the labor of others. The energetic analysis of architecture is a body of methods and experimentally-derived data that can be used to calculate the amount of labor invested in construction projects.

The Acropolis at Yalbac, Belize is a good example of a monumental Maya palace, where ancient rulers acquired the labor of others for their own use. The eight major looter's trenches into the acropolis were cleared and profiled. The profile drawings were used to illuminate the construction history of the Acropolis. Hypothesized construction costs derived from this analysis are discussed in terms of how they reveal differences in the political power of the Yalbac rulers compared to elites at Copán and Tikal, and what that might mean with regard to elite history and changes in political circumstances at Yalbac.

Tentative conclusions reached suggest that the political elite at the three sites employed acquired surplus labor in different ways. The emphasis in the construction of the acropolis palace at Yalbac suggests an emphasis on the diversion of acquired labor for private purposes. At Tikal and Copán, construction labor appears to have been divided in a more balanced manner between public and private building projects.

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CHAPTER 1

INTRODUCTION

At the Classic Maya center of Yalbac, Belize, an ancient Maya elite family had a magnificent palace built on top of an elevated platform. This structure, the Yalbac acropolis, was an important means through which the ruling lineage expressed their political power. For the construction of this structure, they were able to extract labor from their subjects for an essentially private purpose.

My goal is to compare the investment in labor represented by the construction of the Yalbac acropolis to similar architectural monuments at other Maya centers. I will accomplish this goal using volumetric analysis and architectural energetics as guidelines for determining the relative cost of the acropolis compared to structures at Copán and Tikal. Data for the acropolis at Yalbac will be derived from profiles of eight looter's trenches located throughout the structure.

Since large-scale excavation is not a current research goal at Yalbac, the acropolis looter's trenches were investigated in the 2003 field season of the Valley of Peace Archaeology Project, directed by Dr. Lisa J. Lucero, in order to see what information they could provide to enable a better understanding of the processes of acropolis construction. That information is presented and analyzed in this thesis.

Site looting is an endemic problem throughout the world, and is particularly prevalent in the Maya area (Pendergast and Graham 1989). I hope that the methods of gathering data from looter's trenches that I present below will be useful for

researchers at other sites where looting activity has destroyed important evidence.

Hopefully, something can be rescued from the destruction caused by looting.

In the first section of this thesis, I present some general information on power as it affects the procurement of labor for use in monumental construction in ancient societies, and the place of the palace in this process of labor extraction, with specific reference to Maya palaces and political organization. I then discuss the application of energetic investment studies and related volumetric analyses to understand labor strategies among the ancient Maya. Next, I present background architectural data from Copán and Tikal. I then present a description of Yalbac and of Structure 1A, the Acropolis. This is followed by a discussion of the usefulness of information derived from looter's trenches, using examples from other projects. Then, I provide an exposition of information recovered from Yalbac acropolis looter's trenches in 2003. These data will be used to estimate the amount of labor invested in various acropolis construction operations, which will then be compared to similar information from Copán and Tikal. I conclude with some remarks on the significance this project might have for understanding the nature of political power at Yalbac, relative to Copán and Tikal, and what the investigation of looter's trenches could mean for other archaeological projects in the Maya area.

Through the examination of the Maya palace at Yalbac, I will explore similarities and differences among Yalbac's power structure and those of Copán and Tikal. This approach is a logical way of examining political relationships in the archaeological record. By operationalizing labor investment in palace architecture

through energetic analysis, I will be able to provide a framework within which different levels of access to power, as expressed in terms of human energy, can be compared within and among Maya sites. This representation of power differences is not the only implication of monumental architecture. By looking at only this aspect, though, I will be able to directly compare Maya monumental architectural units based on their energetic costs.

This comparison will be analyzed to determine whether differences in patterns of extracting and using surplus construction labor differed among Yalbac, Copán, and Tikal. I will examine whether there are different ratios of private palace construction to that of other, more public buildings, such as ritual and mortuary structures, among the three sites. Such differences would indicate differences in emphasis in the allocation of extracted labor. Such different emphases, in turn, may be tied to the political organization of ancient Maya states.

At this stage in research at Yalbac, all conclusions will necessarily be tentative and subject to later refinement. The kinds of information available at Yalbac will permit only limited comparison to Copán and Tikal, where research has been ongoing for far longer. In many cases, this thesis will highlight things we don't yet know about Yalbac, rather than demonstrating clear patterns.

CHAPTER 2

ARCHITECTURE, LABOR, AND POWER IN ANCIENT SOCIETY

The Nature of Power

An understanding of the control of labor for the construction of monumental architecture requires understanding of power, particularly social and political power. According to Adams (1975:9-10):

power is that aspect of social relations that marks the relative equality of the actors or operating units, it is derived from the relative control by each actor or unit over elements of the environment of concern to the participants.

This kind of social power resides in the interactions between individuals and in their inherent inequalities, in terms of knowledge, access to resources, kin base, and any other relevant factors.

In a more specific sense, power is “the ability of an actor, A, to get another actor(s), B to do something he would not otherwise do, through the application, threat, or promise of sanctions” (Haas 1982:157). Sanctions can be negative—punishments for non-compliance—or positive—rewards for compliance. Wolf (1990, 1999) further refines this concept of interpersonal power (power inherent in human interaction) by dividing it into three types, or modalities. The first is “the ability of an *ego* to impose its will in social action upon an *alter*” (Wolf 1999:5). The second kind of interpersonal power involves control over the contexts of human interaction. This kind of power is the means by which “individuals or groups direct or circumscribe the

actions of others within determinate settings” and is referred to by Wolf as “tactical or organizational power” (Wolf 1999:5). The third important kind of interpersonal power is “structural power,” which involves the distribution and control of energy and organization of the settings of human interaction (Wolf 1999:5). According to Wolf, this last kind of power is more simply seen as the ability of an actor or actors to control and allocate the labor of others.

This last form of power, which Wolf calls structural power, is also frequently called political power. Political power is a particular kind of social power that involves the “ability to extract tribute in the form of surplus goods and labor from subjects” (Lucero 2003:523). Price (1982:724) is discussing this concept of political power when she claims that control of energy is the basis of power, and that power can be measured in terms of differential access to energy. This kind of power is directly involved in the construction of monumental architecture. The ability to allocate other people’s labor is an important statement of power.

Power and the Control of Labor

It is important to distinguish control from power. Control is the “making and carrying out of decisions about the exercise of a technology” (Adams 1975:13). It is critical to note that this definition of control requires both that decisions be made, and then that they be carried out. In many cases, control over a resource or technology requires a politically and socially powerful actor.

Human labor is frequently divided into two categories, sometimes referred to as “necessary” and “surplus” (Saitta and Keene 1990:209). According to Saitta and Keene, necessary labor is that required for the reproduction of the laborer. This means that it involves only labor strictly required for subsistence and reproduction. Surplus labor is any labor beyond that: labor used to produce things not absolutely necessary to subsistence.

In order to control surplus labor, then, a social actor must be in the position of wielding sufficient power to both make and carry out decisions regarding the allocation of that labor. To allocate labor to the construction of what is—in part at least—a private residence requires considerable power on the part of the allocator.

According to Trigger (1978:160):

only at the point where it can be demonstrated that the privileges of the elite are based on wresting significant surpluses from the society at large for their own use can the existence of a state confidently be posited.

The ability to divert surplus labor for personal use becomes an important marker in the identification of state-type social and political organizations. These systems are frequently marked by the development of monumental architecture, including the palaces of the elite.

Labor and Power in Monumental Architecture

Monumental architecture is more than merely functional. Such buildings are intended as statements of the power and positions of ancient elites. A ruler’s ability to direct some of the energy (in terms of human labor) under his control into non-

utilitarian, private construction projects is a demonstration of his power. Power can be expressed through monumental construction (Trigger 1990:125). The constructions of elites are direct statements about their place at the pinnacle of society and their power over fellow humans.

Monumental architectural projects require the investment of significant quantities of surplus labor and the ability to coordinate that labor. They require “leadership, coordination, and finance” (Earle 1997:156-157). Earle (1997:157) claims that the scale of monuments makes them “one of the most remarkable expressions of social power.”

Trigger considers monumental architecture to be a perfect example of the conspicuous consumption of resources. Such consumption is “wasteful spending to enhance social prestige and power” (Trigger 1990:124). The energy that is consumed in the construction of monumental architecture is measured in terms of human labor:

In all of the early civilizations the construction of such buildings required the ability to plan on a large scale, a high degree of engineering skill, [and] *the recruitment and direction of substantial labour forces*. [Trigger 1990:121, emphasis added]

Such labor recruitment, while not necessarily coercive, always represents the expropriation of energy by those in power.

Price (1978:168) argues that elite residences represent a more significant measure of the amount of energy under the control of a politically powerful group than any other class of monumental architecture:

Differential housing... represents... the differential ability of individuals or coresident groups to dip into the total energy flow and divert some of it to

private use—i.e., a much more strongly marked differential access to strategic resources.

An example of conspicuous consumption in elite residence can be seen among the modern day Quichua-speaking Otavaleños of Ecuador. Colloredo-Mansfeld (1994) has observed the conspicuous consumption of surplus in the construction of improved residential architecture among the commercially successful elite. These wealthy individuals and families frequently build impressive homes well beyond their basic needs. In fact, in many cases, the builders of the homes are not even resident in the Otavalo area, having moved to larger cities in Ecuador and Colombia in pursuit of their business interests (Colloredo-Mansfeld 1994:845, 850). The impressive but empty residences are erected solely to express the wealth of the builders to other Otavaleños.

Palaces as an Expression of Social Power

Royal and Elite Residence

In societies where there are differences among various individuals and groups in terms of access to construction resources, including labor, there will be differences in the kinds of residences occupied by elite individuals as opposed to those occupied by commoners. Elite residences will be larger, better made, and may have more and larger rooms (Haas 1982:101-102).

According to Welsh (1979:3) “all societies have been characterized by the exercise of political power by a small number of persons at any given point in time.” Those individuals who occupy positions in which they are able to wield significant political power are referred to as the political elite (Welsh 1979:2). This term is “reserved for those people who actively control the government, through either decision-making or key administrative positions” (Olsen 1970:111). The recognition that power can be derived from all kinds of social interaction, and not just those of governance, means that other kinds of elites may be present in other fields in which certain individuals can gain greater abilities to exercise social power than others. Such fields include science, industry, religion, medicine, and many others (Olsen 1970:111).

The political elite includes royals, nobles, town and provincial governors, and any other individuals actively engaged in wielding political power to govern other people. These are the individuals who control the surplus labor of others and may divert it in order to build palaces (Price 1978). Royal palaces are the residences of the ruling lineages, houses, or individuals of a state system. Sub-royal elites are also frequently able to build palaces (e.g. McKay 1975; Triadan 2000; Guderjan, Lichtenstein, and Hanratty 2003; Harris 2003).

The Nature and Functions of Palaces

Palaces are structures that combine residential, administrative (and frequently productive and ritual) functions. In Egypt, Mesopotamia, and the Near East, palaces

were built in the earliest cities (Badawy 1966). From the beginning they were easily distinguished by their size, complexity, and cost of construction. For example, in Uruk around 2600 B.C. “there appears near the temple a royal palace that rivals it both as to its size and as to the excellence of its materials” (Badawy 1966:90). This pattern is repeated in complex societies throughout the world (e.g., Badawy 1966; Graham 1962; McKay 1975).

The development of palaces is a marker for the rise of a state-type socio-economic system. Trigger notes that the construction of palaces is one way that surplus is co-opted by the elite. Palaces and other monumental constructions that require the investment of large amounts of labor in order to “affirm the personal glory of high status individuals or to display the power of the state” (Trigger 1978:160) are evidence for the existence of a state-type redistributive system.

Palaces, like any building, are settings for human action. A major characteristic of palace architecture is that the buildings are far more than merely functional. As Grabar (1978:209) writes in his study of Madrid’s Alhambra:

[the buildings] were shells for whatever man did, and their character was supposed to be such that pleasure, exhilaration, and excitement were to be generated or heightened by the very fact that these activities took place in them.

Likewise, Harris (2003:62) in her discussion of elite villas in northern Italy claims that:

as a backdrop for the display of codified civility and distinguished conduct, domestic architecture and gardens became critical agents for the transmission and establishment of social position.

In short, palace buildings were purposefully constructed as emotionally striking symbols of social position and power. They were intentionally made more impressive than was strictly necessary for carrying out their functions. This added investment represents the conspicuous consumption of energetic resources. Palaces are indeed expressions of power in Trigger's terms.

The conspicuous consumption of resources in palaces and could express elite rivalry as well as elite position. Evans (2000) notes that the resources (including labor) consumed in the construction of pleasure palaces and gardens in the Aztec empire of Central Mexico served to reinforce ethnic and dynastic differences among the elite. In these cases, palaces of the rulers of various important centers expressed the power of those rulers not only over their own subjects, but also in relation to rulers at other important administrative cities. For example, the pleasure palaces of Nezahualcoyotl, ruler of Texcoco from 1431-1472, expressed his strength and relative autonomy from the Aztec emperors ruling in nearby Tenochtitlan (Evans 2000). Evans (2000:223) argues that such elite residences and pleasure gardens as the Aztec rulers enjoyed were "elaborate example[s] of civic-scale architecture in mature states where rulers controlled massive wealth." This enormous wealth clearly included the ability to command a great deal of labor for the construction of private residences and retreats.

The specific power relations embodied in palace architecture are derived from the socio-economic relations between the elite palace residents and other members of

society. In many cases these unequal relationships result in situations in which elite individuals are able to exert political power over other members of society.

As a result of the power exerted by elite individuals and groups, their residences sustain a variety of functions not seen in the private dwellings of persons of lesser ranks. For example, Naquin (2000:128-143) discusses the various functions of one of the world's great ancient palaces, the Forbidden City and Imperial City of Ming China. She mentions the following in her discussion: imperial residence; residence for a variety of imperial relatives, advisors, bureaucrats, and attached servants; performance of private and public rituals and worship; and a site for hearings, judgments, and punishments. Similarly, Klingensmith (1993) notes that the palaces of the Bavarian court at Munich from 1600 to 1800 were used not only for electoral residence, but to house state functionaries and bureaucrats and to receive diplomats and visiting elite individuals from elsewhere in Europe.

Archaeological Detection of Palaces in Ancient States

Flannery (1998) discusses a number of palaces from early states around the world. These early royal residences and administrative structures frequently (but by no means always) share two important characteristics. These are open interior spaces, such as courtyards, and areas of progressively more restricted access. For example, the Labyrinth at Knossos, considered to be an early palace with mixed residential and administrative functions, features a large central courtyard with relatively public rooms, such as a throne room, around it, and more private rooms with limited

accessibility, such as the King's and Queen's Halls, in more restricted areas of the building (Flannery 1998:22-23). Similar patterns occur in the royal compounds of Chan Chan, Perú, the Ciudadela of Teotihuacán, Mexico, and other palaces discussed by Flannery.

This kind of plan, featuring open spaces, such as gardens and courtyards, and progressively more restricted courtyards and buildings, is often seen in palaces of Oriental and European traditions. Naquin (2000) notes the progressively more restricted "cities" (such as the Imperial City), surrounding the central and almost inaccessible Forbidden City in Ming China. The Topkapi palace, built by the Ottoman Emperors in Istanbul, features a series of progressively more restricted courtyards (Necipoğlu 1991). Visitors to the palace "could never hope to penetrate beyond the threshold of the third gate" (Necipoğlu 1991:243).

The multifunctional nature of palaces can sometimes be identified architectonically. In the case of the Labyrinth of Knossos, Flannery notes that several rooms have been identified as to function. His plan (Flannery 1998:23, Fig 2.3) identifies the throne room, a shrine, a number of storage rooms, and workshops for attached craft specialists in addition to the royal residential chambers. Store rooms were identified by the presence of storage jars, and the workshops of potters, metalworkers, and lapidaries were identified by the presence of raw materials and manufacturing debris (Flannery 1998:22). At the palace of Nestor at Pylos (Flannery 1998:32, Fig. 2.8) there are various storerooms and a waiting room for visiting dignitaries. In this case, the storerooms were identified by the presence of jars for

storing olive oil, and the waiting room was identified by its location and the proximity of a pantry storing wine and drinking cups, presumably for the refreshment of visitors. As in the above examples, these palaces combined both public and private functions, with the more restricted areas of the palace being exclusively for private use.

Maya Palaces and Acropoli

The ancient Maya lived in an area (Figure 1) embracing the modern day republics of Guatemala and Belize, the Mexican states of Tabasco, Chiapas, Campeche, Yucatán, and Quintana Roo, and parts of eastern Honduras and El Salvador (Sharer 1994:20-33). Maya civic and ceremonial centers are found throughout this area. These Maya centers were the villages, towns, and cities of early states. As such, monumental architecture, including both palaces and acropoli, as well as other structure types such as ritual and mortuary temples occurs in many of these centers (e.g. Totten 1926; Andrews 1975).

Acropoli

A Maya Acropolis is defined by Andrews (1975:67) as “a number of related structures of the palace or temple type, which are situated at various levels on a platform or, more precisely, a series of platforms.” Sharer (1994:634) adds, “at many sites, the substructural platforms support more than one building, and in some cases

Figure 1. The Ancient Maya Area. Map Courtesy of Lisa J. Lucero.



modifications and additions eventually unified separate platforms into a single mass.

A large, complex multibuilding platform of this kind is usually termed an acropolis.”

Acropoli can have residential, ritual, or administrative functions, and often combine more than one function (Coe 1988; Sharer 1994). The acropolis at Copán, for example, combined all three functions, with different sections of the structure used for each at different times. From about A.D. 420 to 500, the rulers of Copán lived in a residential and administrative complex (a palace) located on the northern part of the acropolis, with the southern portion reserved for ritual and mortuary functions. After about A.D. 500, the acropolis was greatly expanded, and Copán's rulers moved their palace to a new complex immediately to the south of the acropolis, Group 10L-2 (Andrews and Fash 1992). The *Popol-Na* (i.e. council house, Structure 10L-22A) building along the northern edge of the acropolis probably still fulfilled some administrative functions (Fash et al. 1991), but most were presumably removed to the new palace complex, leaving most of the acropolis exclusively for ritual performance and royal interment (Sharer et al. 1999).

Along with the acropolis at Copán, those most comprehensively investigated by archaeologists are two at Tikal. Both the North Acropolis and Central Acropolis have been the subject of intensive investigations. The North Acropolis (about 40 m tall at its highest point, Structure 5D-22 [Sharer 1994:150, Fig. 4.4]), which was built in stages beginning in the Late Preclassic period (100 B.C.-A.D. 250) to the Late Classic (A.D. 600-900) was trenched down to bedrock in places, and Coe found it to be entirely ritual and mortuary in function (Coe 1990). For the palace structures of the Central Acropolis (about 20 m high [Harrison 1970:55, Fig. 13]), which dates from the Early (A.D. 250-600) and Late Classic period, "the best explanation is one

of a duality of residence and administration” (Coe 1988:62). Harrison (1970, 2003a) believes that the Central Acropolis incorporated buildings used for residence, storage, ritual, the training of elite boys, and many other functions.

Palaces

Palaces are often large and impressive emblems of political power (Badawy 1966). Maya palaces vary significantly in form and function, but many were intended primarily as houses for the wealthiest members of Maya society (Haviland and Moholy-Nagy 1992). These elite and royal houses are distinguished from the houses of commoners in several ways:

They do tend to provide more space per living unit than do lower class household groups...they also tend to protect the privacy of their occupants to a greater degree; for instance, various stairs, stairblocks, screens and gateways have been added to the Central Acropolis [at Tikal] for no other purpose than to serve the privacy of those who lived there. [Haviland and Moholy-Nagy 1992:51]

The basic assumptions made here are that Maya society was stratified and that this stratification is reflected in architecture (see Arnold and Ford 1980:716 for discussion of these and related assumptions). In Mesoamerican archaeology, “it is assumed that upper class individuals had the power to manipulate [the] labor force for nonpublic ends... and that the residential units which these individuals occupied reflected this situation” (Arnold and Ford 1980:716).

That Maya palaces had functions other than residence does not weaken the argument that the consumption of labor in palace construction is a better indicator of

rulers' power than similar labor investments made in more public structures. Even though administration, storage, and craft production could all have been carried out in a Maya palace, all these functions were performed under the direct auspices of the ruler, at his behest, and primarily to the benefit of himself and his relatives.

Administration and storage of the tribute received by the ruler, which Martin (2001) suggests are among the primary functions of a palace, serve first to increase and manage his wealth and that of his dynasty. Likewise, production of specialized crafts could serve to "consolidate relations with external clients" (Martin 2001:178), thereby increasing the wealth and prestige of the ruling lineage. While these functions seem more public than mere royal residence, they are primarily for the benefit of the ruling dynasty. Therefore, the construction of buildings in which these functions could be performed is a way in which the rulers of Maya sites extracted labor from others for their own use.

Of course, palaces are not simply expressions of power. They are also functional buildings, serving as settings for many of the administrative functions of the polity (Flannery 1998). For the purposes of this paper, I am only treating the conspicuous consumptive aspect of construction because it provides a direct link between labor procurement strategies and power. In short, if we look at monumental construction as indicating power differences, then energetic quantification of construction operationalizes those power differences and allows for comparison between various kinds of monumental architecture at different sites.

In Late Postclassic sites from Campeche, Mexico, Williams-Beck (1998:41, 48) identifies a type of structural complex which she calls a “complejo escalonado polivalente” (polyvalent stepped complex). These complexes have characteristics similar to those of the Yalbac Acropolis. They are raised on high platforms with multiple levels, contain courtyards enclosed by long vaulted structures, and have limited access to upper parts of the complex. Based on ethnohistoric sources, Williams-Beck identifies these structures as palaces sharing residential, ritual, and administrative functions. While not arguing for absolute identity of function, enough similarities exist between these complexes and the Yalbac Acropolis to support the contention that the latter is a residential and administrative palace as well.

At other Maya sites, buildings with characteristics similar to those of the Yalbac Acropolis have been identified as elite palaces. Martin (2001:170) describes Maya palaces (which he refers to as court complexes) as having areas of restricted access, with buildings arranged around open spaces “usually in the form of enclosed courtyards or plazas.” He goes on to say that many such court complexes could be set on high platforms. The Yalbac Acropolis fits his description well. Webster (2001:149) discusses access patterns to the Central Acropolis of Tikal, which has been identified as a royal palace (Harrison 1970). His description could apply equally well to the acropolis at Yalbac:

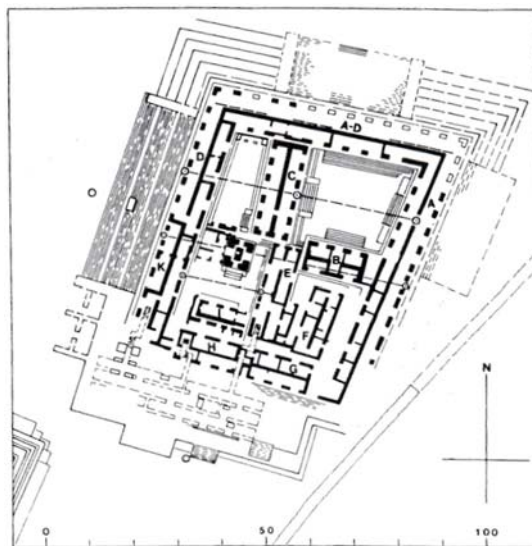
Despite the stairways leading to the great public plazas, access to the inner courts was well controlled, and they formed suitably secluded living spaces for privileged people who lived close to the major public space.

Architectural and Functional Characteristics of some Maya Palaces

Tikal's Central Acropolis is only one of many palaces complexes investigated by archaeologists. Others include the Palace of Palenque (Hartung 1980), Becán Structure IV (Andrews 1999), the A-11 Palace Complex at Río Azul (Adams 1999), The Caana at Caracol (Chase and Chase 2001), Structure III at Calakmul (Folan, Gunn, and Domínguez Carrasco 2001), the House of the Governor at Uxmal (Kowalski 1987), and the Murciélagos Complex at Dos Pilas (Demarest et al. 2003).

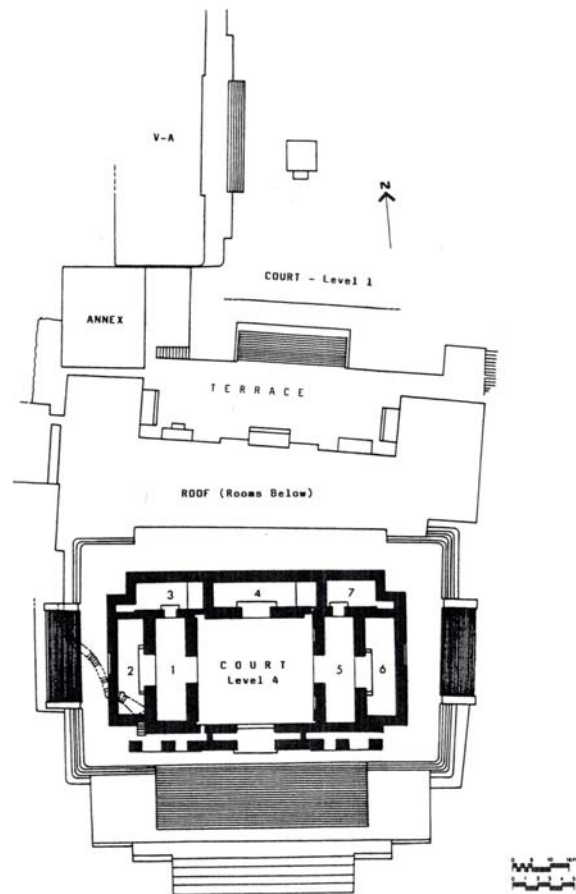
The Palace of Palenque conforms closely to the model of ancient palaces presented above. The buildings (Figure 2) are arranged around a number of courtyards of varying sizes and degrees of restricted access (Hartung 1980). The group is raised on a large substructural platform, and could be considered an acropolis group.

Figure 2. The Palace of Palenque. From Hartung 1980: Fig. 8.



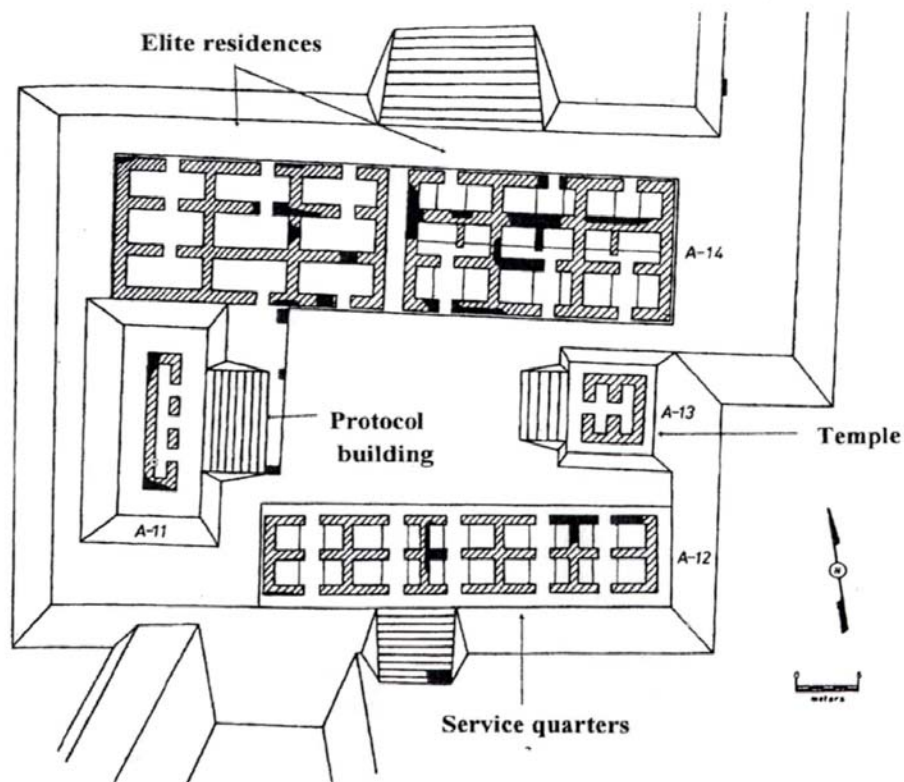
At Becán, Structure IV (Figure 3) also fits the general model (Andrews 1999). Here there are four levels of rooms, from range-type structures around an open, ground-level court (labeled “Court—Level 1” on Figure 3), to highly restricted rooms around a completely enclosed court on a pyramidal substructure (labeled “Court—Level 4”). Andrews (1999:149) writes that, “the four different zones of Structure IV most likely provided a range of spaces for [the] residential, ceremonial, and administrative functions that are part and parcel of the elite-class lifestyle.”

Figure 3. Palace Structure IV at Becán. From Andrews 1999: Fig. 4.



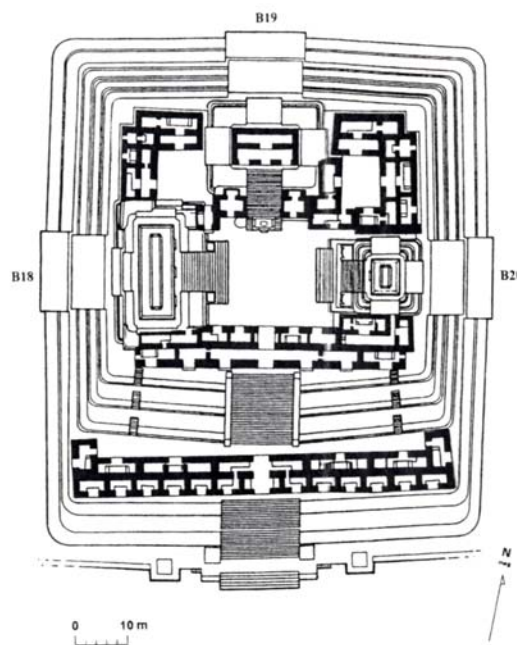
The A-11 Palace Complex (Figure 4) at Río Azul, Guatemala also consists of range-type buildings arranged around an open courtyard (Adams 1999). In this case, there is only one courtyard, rather than a series of progressively more restricted courtyards. Access to certain rooms in the northern range-type structure is restricted, though. In order to get to these rooms, visitors would first have to pass through one or more other rooms. Adams (1999:47) indicates that palace A-11 housed elite individuals and their servants, as well as serving administrative and ritual functions.

Figure 4. The A-11 Palace Complex at Río Azul. From Adams 1999: Fig. 3-11.



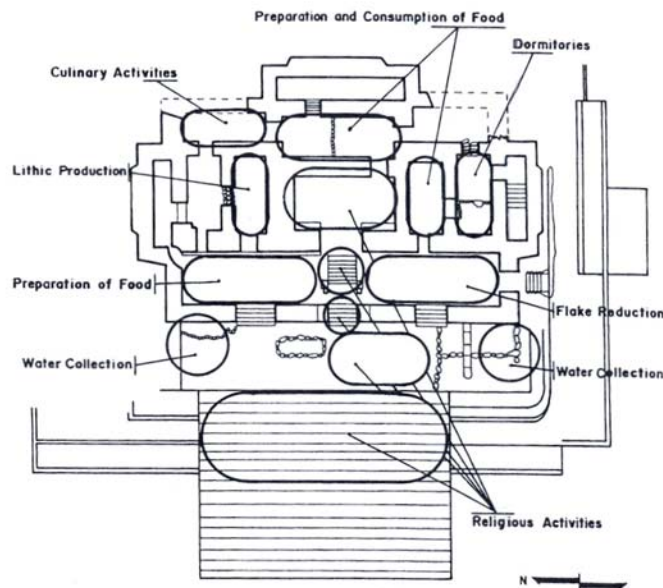
Caracol's Caana palace is somewhat different from other Maya palaces discussed here. The basal platform of this huge Acropolis-palace towers to a total of over 40 m above Plaza B below (Chase and Chase 2001:114). There is a lower range-type structure about halfway up the front of the platform and a series of enclosed courtyards on the top (Figure 5). The lower structure, or "midrange palace" (Chase and Chase 2001:111) serves in part to restrict entrance to the entire upper level, as it is placed across the only stairway to the summit. On top, though, the palace groups conform to the general pattern seen at many Maya sites. There are three fully-enclosed courtyards of different sizes and degrees of accessibility. The ritual structures (B18, B19, and B20) around which the range structures are built suggests the multifunctional nature of this palace complex.

Figure 5. The Caana Palace at Caracol. From Chase and Chase 2001: Fig. 4.3.



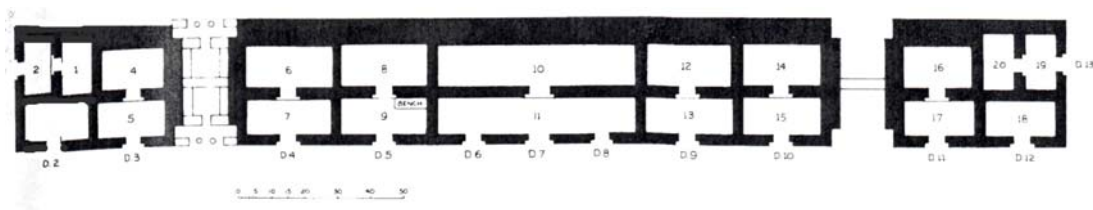
Calakmul Structure III, a well-investigated palace at that major Maya center, is significantly different from the patterns observed at other Maya palaces. This palace appears to comprise only one structure on its own basal platform, rather than a complex of structures arranged around courtyards (Folan, Gunn, and Domínguez Carrasco 2001). While access to different interior rooms was restricted by the complexity of the floorplan, there was no open area or courtyard like those in many other ancient palaces. However, the multitude of functions for which Folan and his colleagues gathered archaeological evidence demonstrates that this structure is indeed a multifunctional palace combining residential, ritual, and productive functions (Figure 6).

Figure 6. Palace Structure III at Calakmul, With Proposed Functions of Various Areas. From Folan, Gunn, and Domínguez Carrasco 2001: Fig. 8.7.



Uxmal's House of the Governor is a similar, freestanding palace. This very large structure is considered one of the most exceptional instances of Maya monumental architecture (Kowalski 1987). Like Calakmul Structure III, the House of the Governors stands on a large basal platform, and is not attached to any other buildings at the site. It is a single structure, rather than an acropolis-type complex or courtyard complex. Unlike the Calakmul palace, though, the House of the Governors does not have any particular access restrictions to its different rooms (Figure 7). Nine of the twenty rooms of the palace are interior, with access necessarily negotiated through one other room. This, however, is a much simpler floorplan than that observed at other Maya palaces. The House of the Governor does, however, share the multifunctional nature of other ancient palaces. Kowalski (1987:85-86) believes that the structure was used for royal residence, political administration, and astronomic ritual.

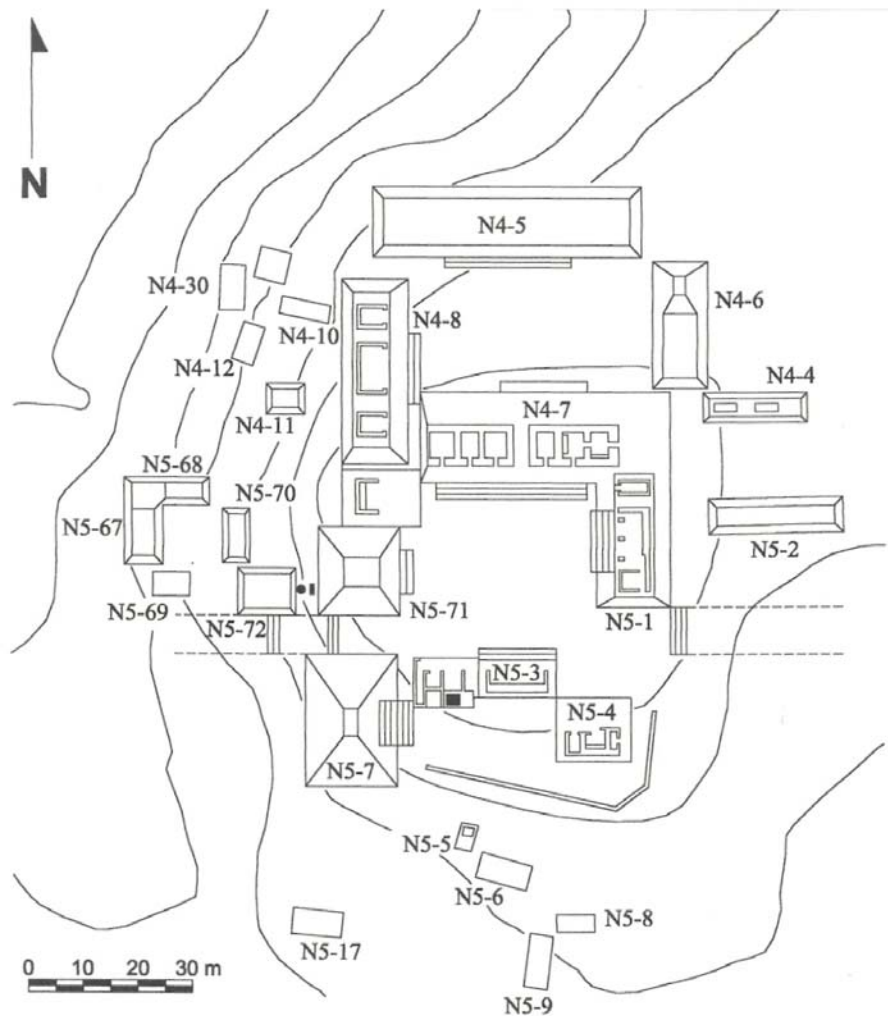
Figure 7. The House of the Governor at Uxmal. From Kowalski 1987: Fig. 41.



The Murciélagos Complex at Dos Pilas (Figure 8) includes ritual, administrative, and residential structures arranged around two courtyards (Demarest et al. 2003). Access to both courtyards is restricted, with the northern courtyard more

difficult to access than the southern one. Among functions proposed by Demarest and his colleagues for Murciélagos Complex buildings are elite ritual, the burial of members of the royal family, throne rooms, reviewing stands, and sleeping quarters (Demarest et al. 2003:128-142).

Figure 8. The Murciélagos Complex Palace at Dos Pilas. From Demarest et al. 2003: Fig. 5.3.



The Archaeological Identification of Maya Palaces

These Maya palaces illustrate the variability that can be observed in such residential and administrative complexes throughout the Maya area. All of the palaces discussed here are believed to embrace rooms, buildings, or areas housing a variety of activities with different functions. As can be seen from the variability presented above, it is clear that recognizing patterns in the archaeological remains of Maya palaces will be difficult. It is clear, though, that many (but not all) of the palaces share a particular pattern of building or complex layout in which different open courtyards are arranged so that some are more accessible and others are more restricted. This pattern is clear in the Palace at Palenque, Structure IV at Becán, the Caana at Caracol, and the Murciélagos Complex at Dos Pilas. It is absent at the other palaces described: the A-11 Complex at Río Azul, Structure III at Calakmul, and Uxmal's House of the Governor.

As mentioned, the pattern of buildings arranged around open courtyards with differing levels of accessibility is common to ancient palaces from around the world. Those Maya palaces which fit this description would be the easiest to recognize archaeologically. In most cases, it should be possible to identify such palace complexes by plan and building layout without the need for excavation. Other palaces, which do not fit this general plan, would need to be identified primarily through functional and contextual evidence derived from excavations or epigraphy.

Political Implications of Maya Palaces

Maya palaces serve as settings or foci for the “extraction of wealth from primary producers and the transformation of this wealth into political power” (Brumfiel 1994:2). Brumfiel (1994) identifies five kinds of agencies in charge of the extraction of surplus wealth in ancient, tribute-based states. These agencies are military bureaucracies, tax-collecting bureaucracies, specialists in long-distance exchange, religious ritual specialists, and producers of elite goods. Maya palaces housed elite individuals responsible for some or all of these methods of surplus extraction. The labor involved in the construction of Maya palaces was itself one such process of extracting surplus from subject populations.

The Maya palace is also an expression of the political power of a lineage or elite “house” (following Gillespie 2000). Ciudad Ruiz (2001:333) points out that palaces express the political power of a particular lineage making the affairs of that lineage a matter of polity-wide, rather than lineage-exclusive, importance. These buildings inspired emotional responses—both positive and negative (Inomata 2001)—in subject people; responses which “derived partly from the common knowledge that the construction and maintenance of large, elaborate buildings required a conspicuous amount of labor” (Inomata 2001:342).

In short, understanding the importance of elite palaces, both royal and non-royal, in a Maya state helps to explain the political organization of the polity. The importance of the palace in the process of extracting and consuming surplus is impossible to ignore. Similarly, the emotional aspect of palace construction, a

product of the conspicuous consumption of labor involved, relates directly to the expression of political power. The implications of large palace structures in otherwise small centers may suggest that the extractive organization of those centers was oriented toward private elite goals, and not toward more public goals. At centers like these, the control of labor may have been directed toward elite residence because of the need to express the power of middle-ranked political elite families over local subject peoples. At larger centers, it is likely that surplus labor earmarked for construction would be used to emphasize not only elite political power, but also their power in arenas such as religious institutions, designed to exert regional, rather than merely local, control.

Maya Political Organization

Ajawob and Sajalob

Classic Period Maya states were ruled by lords given the title *ajaw* (plural *ajawob*) who resided in large regional capitals, including Copán and Tikal (Martin and Grube 2000). Below this uppermost level was a group of lesser lords who were titled *sajal* (plural *sajalob*), and were frequently the rulers of smaller centers within the sphere of a regional capital's political control (Martin and Grube 2000; Houston and Stuart 2001). The regional capital was “the dynastic seat at their [the various polities'] core, their ceremonial and commercial focus and the hub from which ties

radiated to lesser lordships in their periphery” (Martin and Grube 2000:20). These peripheral lordships were the domains of the *sajalob*.

A system such as this one implies a hierarchical organization of settlements, with the regional capital at the top, and various levels of smaller centers below. Flannery (1998) claims that a four-level settlement hierarchy is indicative of state-type political organization. In the case of the Classic Maya, a four-level hierarchy is probable, with regional capitals administering secondary centers, small minor centers, and scattered villages and household groups (Lucero 2002).

Approaches to Site Hierarchy

Lucero (2002:819) has characterized Yalbac as a “secondary center” and Tikal and Copán as “regional centers.” She discusses regional centers as the capitals or royal seats of large polities, whereas secondary centers are characterized by:

their rulers’ participation in a royal interaction sphere established by regional rulers: rulers from secondary centers interacted with those in regional centers in such activities as intercenter alliances, marriage, warfare, prestige goods exchange, and royal rites. [Lucero 2002:819]

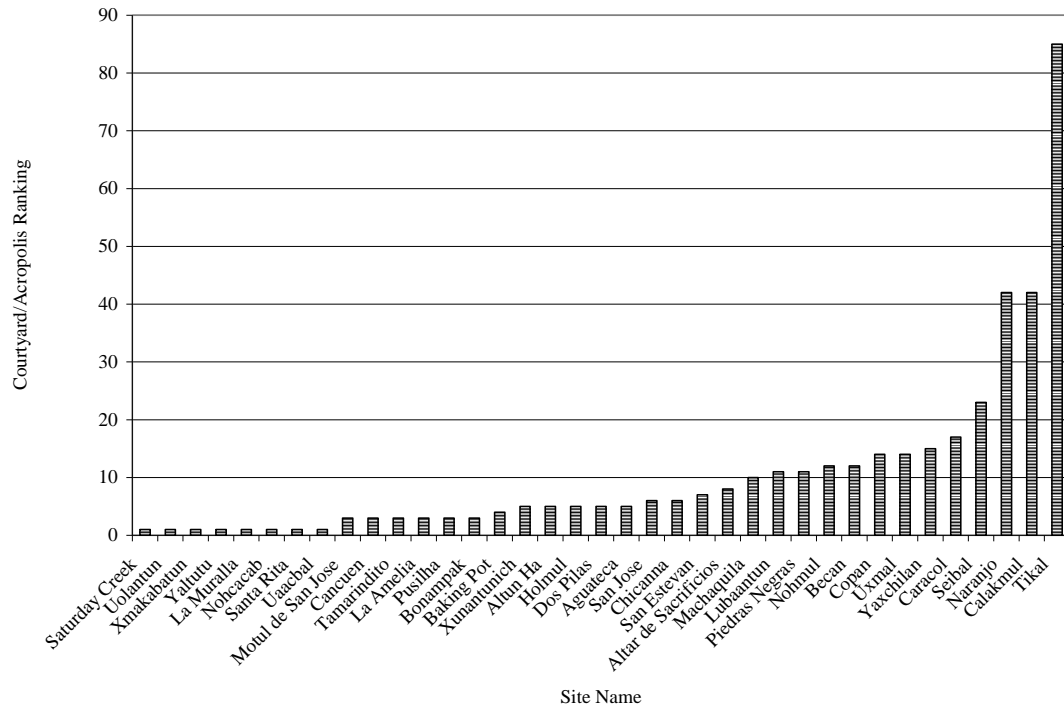
Copán and Tikal are both regional centers, following Lucero’s classification system. Yalbac, on the other hand, is a secondary center. Other centers, including nearby Saturday Creek and Barton Ramie, are considered minor centers, which are areas with dispersed settlement, “a condition not conducive for aspiring leaders to monopolize resources and acquire surplus” (Lucero 2002:820).

Adams and Jones (1981) have provided a ranking method for classifying Maya centers based on the number of courtyards and acropoli in their monumental core. This ranking system is a highly simplified version of a type proposed by Turner, Turner, and Adams (1981). In that method, ranking was based on complex volumetric estimates made for courtyard groups. The method proposed by Adams and Jones simplifies this to a simple count of the courtyards. Acropoli are counted as being equivalent to two courtyard groups, based on an assumption that “the physical mass relationship of an acropolis to a courtyard group in the same site is... roughly 2:1” (Adams 1981). Their rankings for numerous Maya centers are shown in Figure 9. They did not analyze Copán in this manner, so the figure presented for Copán is an estimate based on the method presented by Adams and Jones, as is the figure presented for the minor center of Saturday Creek. This method consists of counting the number of courtyards in the monumental core of the center and totaling them. An additional two points is then added to each total to account for each acropolis among the monumental structures.

Maya Politics

Sites with particular hieroglyphic symbols known as emblem glyphs are often thought to have been politically important in the Maya area (e.g. Marcus 1976, 1993; Matthews 1991). Matthews (1991) views all sites with emblem glyphs as roughly equivalent. Each such site is, in his model, the capital of a small state. Marcus (1976,

Figure 9. Courtyard/Acropolis Rankings of Maya Sites. Data from Adams and Jones 1981 except as indicated in text.



1993) on the other hand, claims that other epigraphic evidence, such as mentions of certain centers in the texts of others, imply that there were hierarchical relationships among sites with emblem glyphs, and that not all such sites were independent capitals. This debate is unresolved, but I will follow Marcus' model for the purposes of this thesis. Marcus makes a more nuanced interpretation of Maya epigraphy based on multiple lines of evidence.

Marcus (1993) draws on epigraphic evidence to posit a Maya political system dominated by four to six regional states. The four more stable states, she believes, were centered on the regional capitals of Tikal, Copán, Calakmul, and Palenque. At

times, other states rose to power centered on Yaxchilán and the Petexbatún region. The latter state had various capitals at different times, with power alternating among Dos Pilas, Seibal, and Aguateca.

This thesis will help to define the role of Yalbac and its palace, Structure 1A, in Classic Maya politics. The place of Yalbac in regional site hierarchies and its possible roles in area polities will be discussed.

CHAPTER 3

ASSESSING CONSTRUCTION LABOR PROCUREMENT IN THE MAYA AREA

Background to Energetic Analysis of Maya Architecture

Formulae for assessing the amount of labor invested in Maya architecture must primarily be derived from the experimental work of two researchers. Erasmus (1977) conducted construction experiments at Uxmal, in the Puuc region of Mexico's Yucatán. His primary interest was to "obtain a measure of the man-days of labor invested in the construction of Maya ceremonial centers" (Erasmus 1977:53). He therefore concentrated his experimental approach on the costs of construction of masonry substructures and superstructures. Abrams (1984a, 1984b, 1994) conducted more detailed experiments at Copán, Honduras. He attempted to understand the energetic investments presented by a whole range of structure types. Therefore, he quantified the construction of everything from the most complex façade sculptures to the simplest open-walled pole-and-thatch shelters. Generally speaking, Abrams' figures should give more accurate figures for most types of monumental construction, because of the greater scope, breadth, and detail of his experiments and observations.

Abrams (1984a, 1984b, 1987, 1989, 1994, 1998; Abrams and Bolland 1999) has examined the procurement and organization of construction labor in Classic Maya society. His primary approach for assessing the amount of labor required to construct Maya buildings is what he refers to as architectural energetics (Abrams 1984a, 1989, 1994). Energetics is "the measurement of energy (in some form) and its

transformations within a defined system” (Abrams 1994:37). In architectural analysis, a method “that translates construction behaviors into labor costs” (Abrams 1994:38) is an application of energetics.

Abrams conducted an extensive series of experiments and observations at Copán in order to define the energetic investment represented by various Maya buildings (Abrams 1984a, 1994). He concluded that the amount of labor required to build architectural monuments among the Classic Maya was surprisingly low (Abrams 1994; see also Webster and Kirker 1995), particularly since each construction phase added only a fractional increment to the total volume of a structure. The only public structure (Str. 10L-22) that Abrams dealt with required approximately 24,705 person-days (p-d) of labor to construct (Abrams 1994:133). Several elite residences required over 1,000 p-d of labor, the largest and most complex (Structure 9N-82-C) required 8,567 p-d. Webster and Kirker (1995), based on these data, suggest that the entire monumental core of Copán could have easily been constructed using a system in which each family of Copán residents donated only one member to public construction projects every ten years. This estimate would probably be only slightly increased when elite structures outside the site core, which were probably also built with acquired labor, are considered, since the overall volume of these structures is far less than that of the monumental core (Abrams 1994).

At other Maya sites, energetic analysis has been used to generate rough estimates for labor investment in monumental architecture. Erasmus (1977), for

example, conducted experiments to determine how much construction a person could do in one day using traditional Maya methods. Then, based on volumes of architecture for the entire site center, he calculated the total number of person-days invested in the construction of Uxmal, Mexico. By this method he arrived at a figure of 7.5 million person-days of labor to build the site. When divided by a 250-year span to account for the site's whole occupation, he came up with an estimate of 30,000 p-d per year invested in Uxmal's site center (Erasmus 1977:70). He further concluded that each of the households at Uxmal (he estimates a total of 1,200 households) would have had to contribute only about 25 p-d of construction labor per year. While substantially higher than Webster and Kirker's estimate for Copán, this is not a particularly large figure, since it represents only a minimal investment in public construction for any given resident of Uxmal in any given year.

At Tikal, Arnold and Ford (1980) used a modified version of Erasmus's experiment-based formulae for calculating labor to estimate the scale of investment in each of 630 residential units (ranging from single structures to plazuela or courtyard groups) near the site center. They used the estimates to rank the residential units by amount of labor invested. This ranking was then used to test the hypothesis that higher-ranked units would cluster closer to the monumental core of the site. This approach requires a significant degree of standardization of construction cost estimates. Buildings were quantified based on basic descriptive information, primarily derived from the Tikal site maps. Many structures, particularly plazas and

“shrines” were standardized to the degree that all of their occurrences were treated as equivalent units (Arnold and Ford 1980:719-722).

At Sayil, Carmean (1991) used figures from Erasmus’ experiments along with those proposed by Arnold and Ford to propose a six-rank hierarchy of residences in a broad transect through the site center. At the top of this hierarchy are four architectural groups that were presumably residences of the highest-ranking elites at the site. Even among these large residences, one (Platform 92), stands out as being significantly larger than any other residence in the transect (Carmean 1991:162). Presumably, this residence would have belonged to one of the highest-ranking families at the site.

These approaches based on the work of Erasmus were marked by a tendency to standardize structure types. Structures were not dealt with on an individual basis, but as parts of complexes (Carmean 1991) or as interchangeable units (Arnold and Ford 1980). Erasmus himself dealt only with overall volumes of construction at Uxmal, and not with particular buildings (Erasmus 1977). The experiments of Abrams at Copán make more refined interpretations about ancient Maya labor investment possible.

Abrams’ Formulae for Quantifying Energetic Investment in Maya Architecture

Abrams’ cost estimates for the various operations involved in Maya monumental construction are detailed in Table 1. The table follows his organization of tasks, subdividing building into operations related to the procurement of raw

materials, transportation of the materials to the construction site, manufacture, and construction (the actual erection of the building).

Webster and Kirker (1995:370) have converted Abrams weights (in kg) per unit energy (person-day) for cobble and tuff procurement into more useful volumes per unit energy. According to their figures, one laborer can quarry 3.86 m³ of cobbles or 0.4 m³ of tuff in one day. I will use these figures in estimating labor investments at Yalbac, since it will be easier to estimate volumes of construction operations than to estimate their weights.

For the construction of rubble structure cores, Abrams did not apply any additional formulae or figures. He believes that the placement of loose material to build up the core is included in the transport cost of the raw materials used. He does suggest that for about one-tenth of every cubic meter of substructural core construction, a modifier be applied to reflect the labor involved for the placement of mortar and of tamping (in the case of earth) and consolidating (in the case of stone) the core. The simplest way to factor in this additional modifier is to simply multiply the volume of the substructure by 0.1 (ten percent). For this kind of careful core placement and consolidation, Abrams gives a figure of 4.8 m³ of core per person-day. He believes this same figure should be applied to the substructural wall backing “extending 10 cm from all walls and platform surfaces” (Abrams 1994:50). Abrams estimates that this kind of core and wall backing placement can increase the cost of small substructures by one or two person-days. When dealing with a large substructure, like the Yalbac acropolis, it may increase the cost significantly.

Table 1. Abrams' Cost Estimates Per Construction Task.
Modified from Abrams 1994:44.

Procurement of raw materials:	
Earth:	2.6 m ³ per person-day ^a
Cobbles:	7,200 kg per person-day
Tuff:	750 kg per person day
Transportation of raw materials:	
m ³ per person-day =	$Q \times \frac{1}{(L/V + L/V')} \times H^b$
Manufacture:	
Dressed masonry:	1 m ³ per 11.6 person-days
Rough cobbles:	1 m ³ per 1.19 person-days
Plaster:	1 m ³ per 43.9 person-days
Construction:	
Fine fill and superstructural wall fill:	4.8 m ³ per person-day
All walls:	0.8 m ³ per person-day
Cobble subflooring (floor ballast):	9.6 m ² per person-day
Plastering:	80 m ² per person-day

^a Figure taken unaltered from Erasmus (1977), Abrams did not experiment with the quarrying of earth.

^b Q = Quantity transported per load; L = Lead (transport distance in m); V = Velocity, loaded; V' = Velocity, unloaded; H = hours per day. Abrams (1994) assumed that V = 3 km/h and V' = 5 km/h for an experimentally determined standard load of Q = 22 kg. Depending on the strenuousness of the task, he follows Erasmus (1977) in suggesting a person-day of either H = 5 hours or H = 8 hours.

Abrams' formulae were derived exclusively from experiments and observations undertaken at Copán. As such, they are site specific, and there are some difficulties associated with their application outside the Copán Valley. Particular problems associated with the application of these figure to Yalbac will be discussed in Chapter 9.

CHAPTER 4

ENERGETIC INVESTMENT IN MONUMENTAL ARCHITECTURE AT COPÁN AND TIKAL

Trigger's (1990) attribution of monumentality in architecture to patterns of conspicuous consumption implies that among the principal functions of Maya acropoli is their symbolic expression of the power and prestige of elite families. The rapid construction of such a symbol is more likely to have been the action of a new or tenuous ruling family seeking to consolidate their power than that of an old and secure dynasty with less need for such expression. At Copán, the acropolis was monumental in scale, but did not serve as the primary residence of the royal family, being rather an elite ritual and mortuary complex (Sharer et al. 1999). At Tikal, the Central Acropolis, believed to be the primary royal palace, is indeed a large structure, but is not nearly as monumental in scale as the temple-pyramids and mortuary complexes that surround it (Coe 1988).

Copán

At Copán, Sharer, Traxler, Miller, E. W. Andrews V, and others have studied changes in royal architectural compounds beneath, on, and near the Acropolis (Andrews and Fash 1992; Sharer, Miller, and Traxler 1992; Sharer et al. 1999; Andrews et al. 2003; Traxler 2003). Hendon has examined the architecture and function of non-royal elite residences (Hendon 1987, 1989, 1991) in the important Las Sepulturas Zone (Figure 13), located northeast of the monumental core of Copán.

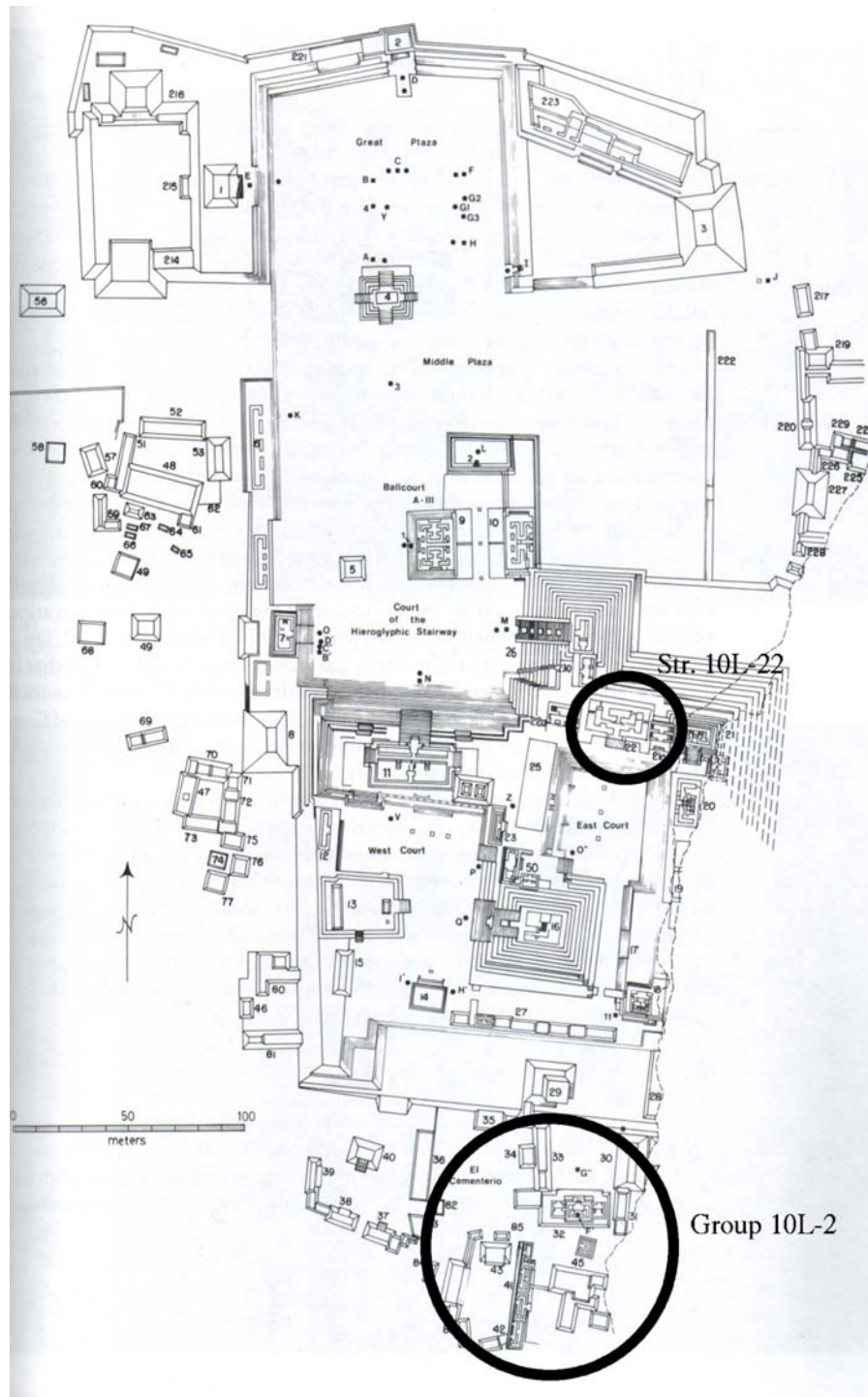
For most of these buildings, energetic studies have not been conducted. Abrams (1994) has quantified the energetic investment made by the ancient Maya in Acropolis Structure 10L-22, and in most of the excavated structures of the Las Sepulturas Zone. The natures and functions of all of these Las Sepulturas Zone structures are discussed by Hendon (1987, 1989, 1991). Structure 10L-22 is identified by Sharer and his colleagues (Sharer et al. 1999:20) as having primarily ritual and mortuary functions, although Trik (1939) believed it to be a palace.

The Acropolis

In its first major phase, Copán's acropolis was a ritual or mortuary complex, where important members of the ruling lineage performed public and private rituals and, at their deaths, were interred in funerary monuments. At this point, the royal residential palace was a separate structure to the north of the small acropolis (Sharer et al. 1992, 1999). In later construction stages (Figure 10), the acropolis grew to the north, displacing the palace to a new complex immediately to the south, Group 10L-2, comprising building 10L-32 and its associated structures (Andrews and Fash 1992).

During an intermediate stage of construction, referred to as the Division III Acropolis (c. A.D. 500-600), residential palace structures stood on a northern extension of the acropolis. This 40 m long, 5 m high platform fully covered the older palace buildings that had been built in the same location (Sharer et al. 1992). By the next construction stage, the Division II Acropolis (c. A.D. 600-700), this palace platform had been covered by an additional 5 m of fill. The new buildings built on

Figure 10. Plan of the Ceremonial Core of Copán. The Acropolis
 Dominates the Southern Half of the Site Core.
 Modified From Newsome 2001: Fig. 1.6.



the summit of the northern acropolis were ritual and mortuary in function (Sharer et al. 1992). It was at this stage that a new palace, the 10L-2 or El Cementerio group was built immediately adjacent to the south edge of the acropolis (Andrews and Fash 1992). In each of the construction stages of the Copán acropolis, significant additions increasing the areal extent and height of the acropolis were made. In the construction episode marking the change from Division IV to Division III, the above-mentioned 40 m long, 5 m high northern extension, complete with summit buildings, was added to the then small acropolis. Between Divisions III and II, this extension was surmounted by construction fill, and the bulk of the acropolis by the addition of 1 m of fill (Sharer et al. 1992).

Division II structures demonstrate clear continuity with their Division I successors, the summit buildings of the final version of the acropolis. For example, the Division II building known as Chachalaca (10L-22-6th) is rebuilt several times to emerge as the final structure 10L-22. Similarly, the Division II structure known as Ante was recreated in the final summit structure 10L-20 (Sharer et al. 1992). This continuity allows investigators to conclude that the functions of different areas of the Copán acropolis had been set fairly firmly by the beginning of the Late Classic period, around A.D. 600. As Sharer and others (Sharer et al. 1992:153) write, “The Division II Acropolis . . . represents a major shift in orientation from that seen in the previous versions, and appears to set the stage for the final construction phase.”

The majority of the successive construction stages of the Copán acropolis were marked by the partial demolition of preceding structures prior to the start of new construction operations:

In the case of buildings (superstructures), burial usually included the partial demolition of roofs and upper walls and the filling of rooms to support new construction. [Sharer et al. 1992:147]

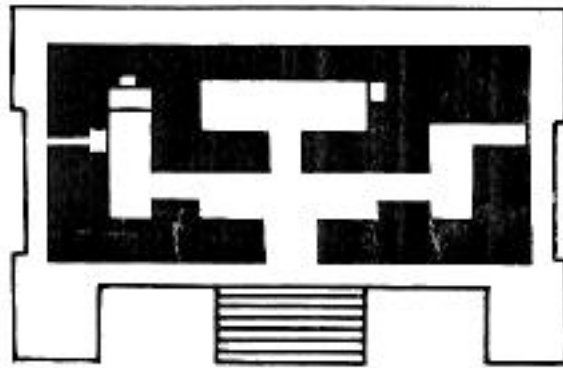
This process of partially dismantling an earlier structure and filling its rooms to support a new building is common throughout the Maya area (Sharer 1994; Stierlin 1964; Totten 1926). At Tikal, as at Copán, this accretionary method is one of the hallmarks of construction.

Structure 10L-22

Structure 10L-22 (Figure 11) is a large summit building of the final phase of the acropolis. Trik (1939) identified the structure as a palace, but current research supports the idea that the building was ritual and mortuary in function, rather than residential. It has been identified as the funerary temple of a prominent Copán ruler of the Late Classic, Ruler 13, or “Eighteen Rabbit” (Sharer et al. 1999:4, 20).

Based on a plan presented by Abrams (1994:56, Fig. 11), Structure 10L-22 is roughly rectangular, measuring about 45 x 20 m. The exterior walls of the structure are as much as 9 m thick. Interior wall thicknesses exceed 4 m. The structure had a vaulted roof and a complicated mosaic sculpture on its west face (Trik 1939).

Figure 11. Copán Structure 10L-22. From Robicsek 1972: Fig. 103.



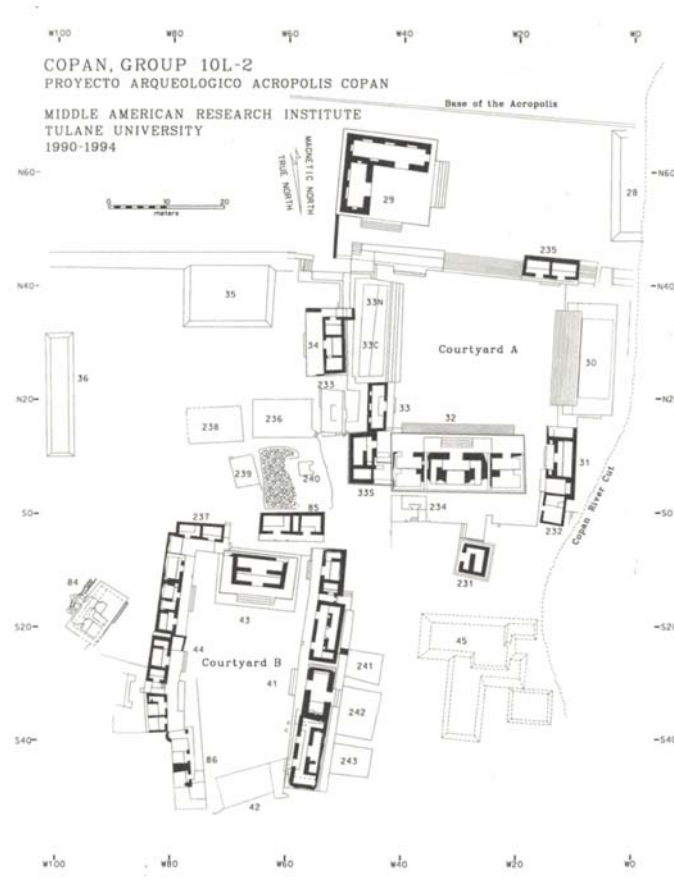
Group 10L-2

Group 10L-2 (Figure 12) is believed to represent the Late Classic period palace of the rulers of Copán (Andrews and Fash 1992; Andrews et al. 2003). Structure 10L-32 has been identified as the primary palace. Andrews and his colleagues believe that buildings in this group were used for a variety of purposes, including residence, ritual, administration, public display, and (based on iconographic evidence) as “a place to train young nobles in the arts of ritual, war, and administration” (Andrews et al. 2003:94).

No energetic analysis has been carried out at Group 10L-2, and no one has estimated the volumes of the structures comprising the group. It is clear, though, that the complex is large, with the largest single structure being 10L-32 itself. This structure measures about 22 m by 9 m. Other major structures in the group, comparable to 10L-32 in size, include 10L-43, 10L-29, and 10L-30. Smaller

structures, such as 10L-232 (about 4 m x 5 m) and 10L-237 (about 8.5m by 2.5 m) also occur in the group.

Figure 12. Copán Group 10L-2. From Andrews et al. 2003: Fig. 3.2.



The Las Sepulturas Zone

For the Las Sepulturas Zone (Figure 13) structures for which Abrams estimated energetic investment, functions are posited by Hendon (1987, 1991). These data for all Copán elite structures analyzed by Abrams is summarized in Table 2.

Table 2. Energetic and Functional Assessment of Structures at Copán.

Structure	Function ^a	Person-days ^b	Structure	Function ^a	Person-days ^b
Main Group			Group 9M-22		
10L-22	Ritual ^c	24,705	9M-197	Ritual	1,603
Group 9N-8			9M-192	Ritual	452
9N-80	Ritual	1,903	9M-195B	Dominant	5,058
9N-82C	Dominant	8,567	9M-194B	Dominant	2,761
9N-67	Dominant	4,477	9M-189	Dominant	986
9N-69	Dominant	4,021	9M-199	Residential	2,861
9N-97	Dominant	3,890	9M-193B	Residential	676
9N-82E	Residential	7,491	9M-191N	Residential	504
9N-83	Residential	5,893	9M-193A	Residential	422
9N-73	Residential	3,429	9M-191W	Residential	191
9N-82W	Residential	2,361	9M-245B	Residential	158
9N-72	Residential	2,228	9M-246	Residential	105
9N-68	Residential	2,199	9M-196	Residential	101
9N-74B	Residential	2,101	9M-240	Residential	92
9N-74C	Residential	1,819	9M-190	Residential	72
9N-91	Residential	1,488	9M-195A	Ancillary	160
9N-74A	Residential	1,479	9M-241	Ancillary	98
9N-71	Residential	1,439	9M-194A	Ancillary	39
9N-81	Residential	1,007	9M-200	Ancillary	30
9N-75	Residential	266	9M-244	Ancillary	20
9N-92	Residential	256	9M-242	Ancillary	18
9N-95	Residential	39	9M-245A	Ancillary	11
9N-108	Residential	31	Group 9M-24		
			9M-212	Residential	127
			9M-213A	Residential	76
			9M-213B	Residential	20

^a From Hendon 1991:898-899 except as noted

^b Person-days of labor investment. From Abrams 1994:133-145

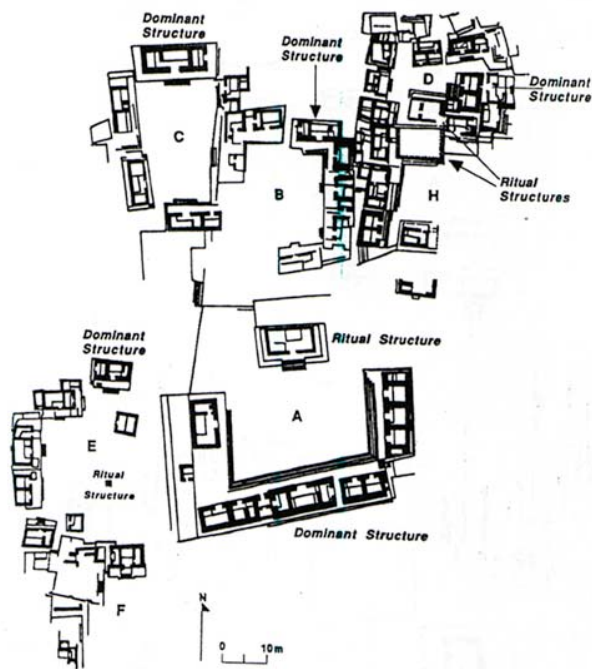
^c From Sharer et al. 1999:20

Structures with the prefix 9N belong to the largest group of patios in the Las Sepulturas Zone, Group 9N-8. This complex contains residential and ritual structures suggesting a range of status. The probable residence (Structure 9N-82) of the most highly ranked household in the Las Sepulturas Zone is in this group. Other residences in the group are presumably those of lower status individuals within or attached to the same elite lineage (Hendon 1991). Structures with the prefix 9M belong to one of two smaller patio groups, 9M-22 or 9M-24. Structures 9M-212, 9M-213A, and 9M-213B belong to the smallest Group 9M-24. All the other 9M structures are in Group 9M-22. Group 9M-22 is a middle-ranked elite patio group, while 9M-24 is even lower in status, but still best classified as the residences of an elite lineage and its dependents (Hendon 1991).

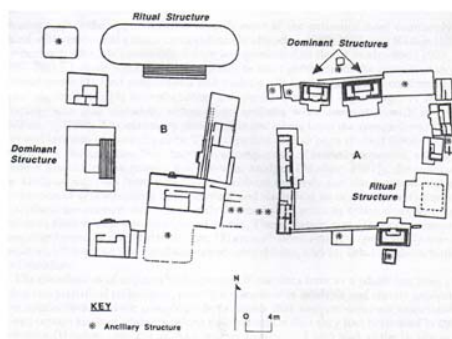
Other buildings which Abrams analyzed to calculate energetic investments do not appear in Table 2. These structures are in groups more distant from the site center. All of them probably represent the remains of the residences of commoners, rather than those of elite individuals (Gonlin 1993; Abrams 1994).

As can be observed in Table 2, there are three primary classifications for Las Sepulturas Zone structures. Ritual structures are identified mainly by comparison to similar structures at other Mesoamerican sites, as well as by artifacts found in association with them, principally “those... related to ritual activities, such as censers, candeleros, and figurines” (Hendon 1991:903). Residential structures account for the majority of the buildings in the Las Sepulturas Zone. These structures are “used for

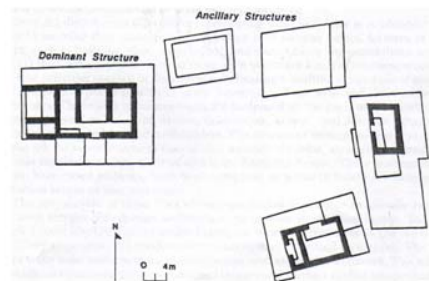
Figure 13. The Three Las Sepulturas Zone Groups Discussed by Hendon. Modified from Hendon 1991: Figs. 2, 3, and 4.



Group 9N-8



Group 9M-22



Group 9M-24

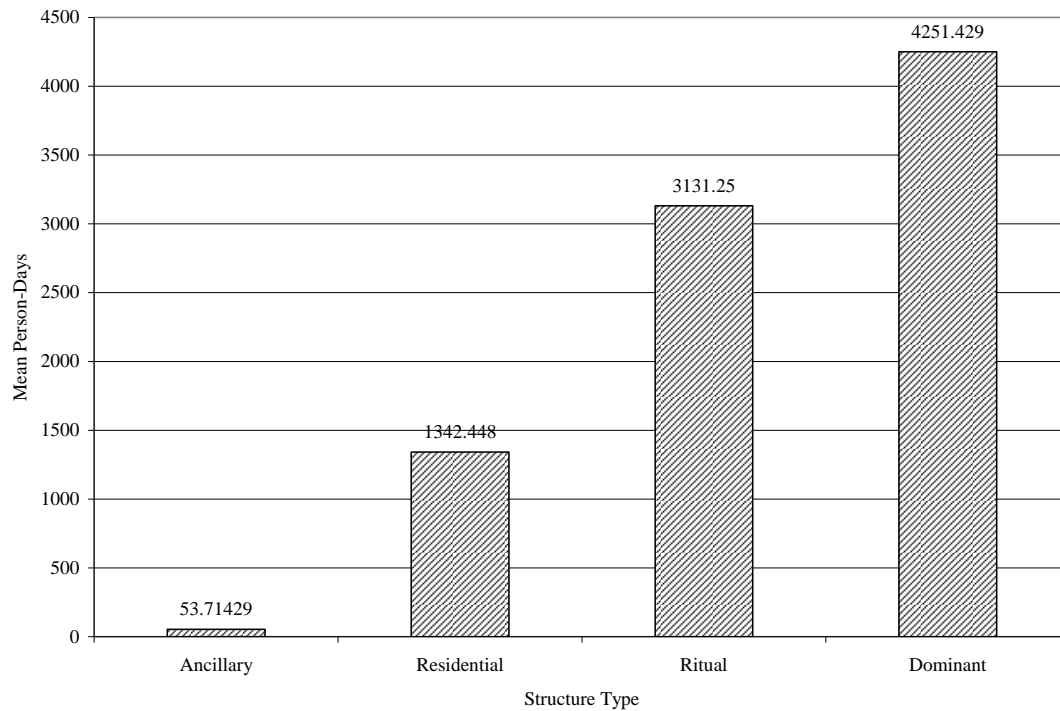
sleeping and many tasks associated with daily living” (Hendon 1991:901). Ancillary structures are “buildings used as storehouses and as cooking and food-preparation areas” (Hendon 1991:900). Hendon creates these three categories based on both architectural form and associated artifact assemblages. Among the residential structures, each patio group has at least one which is better built, and frequently larger, than the others. Hendon calls these larger residential buildings “dominant structures” (Hendon 1991:906).

The mean energetic investment in each of the principal structure types is presented in Figure 14. Dominant and non-dominant residential structures are separated into two columns.

As can be seen from Figure 14, dominant structures are, on average, the most expensive in terms of labor cost. Ritual structures, other than Structure 10L-22, represent the second highest average labor investment. The average for non-dominant residential structures is less than half that for ritual structures and only slightly more than one-quarter of the average for dominant structures. Ancillary structures represent a significantly smaller average labor investment.

A dominant structure is not, in itself, a palace. Two of the groups of structures analyzed by Hendon and Abrams at Las Sepulturas arguably represent the remains of non-royal elite palaces. These are Groups 9N-8 and 9M-22. That these groups could be considered palaces is evidenced by their large size compared to other, non-elite structures, their multi-functional nature, and, at least in the case of

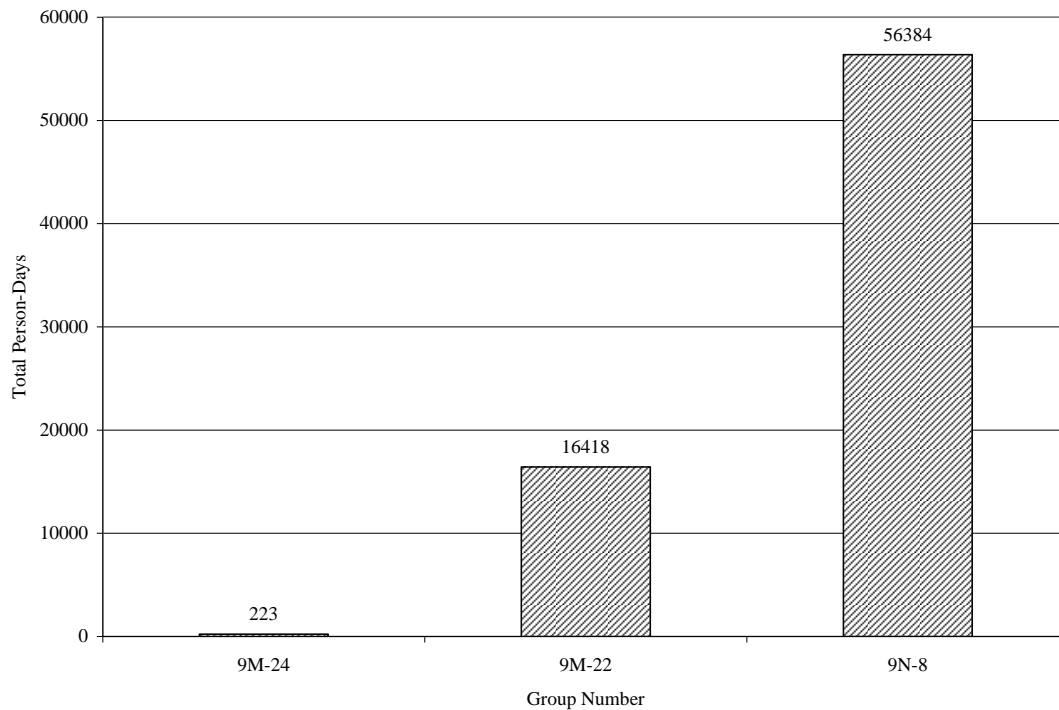
Figure 14. Mean Labor Investment in Las Sepulturas Zone Structure Types.



group 9N-8, by the restriction of access to different courtyards and structures in the group. If each of these two groups, 9N-8 and 9M-22, is treated as a single palace complex, then we can discuss the total labor invested in each of two non-royal elite palaces at Las Sepulturas. This information is presented in Figure 15, where the totals for all the structures from each group have been added together. The smaller Group 9M-24 is included for comparative purposes. This residential complex is significantly larger than non-elite patio groups elsewhere at Copán (Abrams 1994). However, its relatively small size compared to the other two Las Sepulturas groups analyzed and the lack of evidence for ritual functions (suggesting only habitation and

domestic production occurred in the group) argue against considering this smaller complex a palace.

Figure 15. Total Labor Investment in Three Non-Royal Residences at Copán.



As can be seen from Figure 15, the investment in these three structural complexes varies widely. The largest group, 9N-8, was about three-and-a-half times more expensive to build than Group 9M-22, and more than 250 times as costly as the small Group 9M-24. The amount of energy invested in the two large elite palaces suggests that their residents had the ability to appropriate the labor of a significant number of people. There is no way to assess the amount of labor invested in the royal palace, Group 10L-2, but it is possible that Group 9N-8 was nearly as costly to build.

This suggests that non-royal elite individuals at Copán could sometimes wield power nearly on a par with the center's rulers.

Tikal

The North Acropolis at Tikal was extensively trenched by the University of Pennsylvania project between 1956 and 1970, with excavations directed by Coe (1990). The Central Acropolis was explored by the same project, under the direction of Harrison (1970).

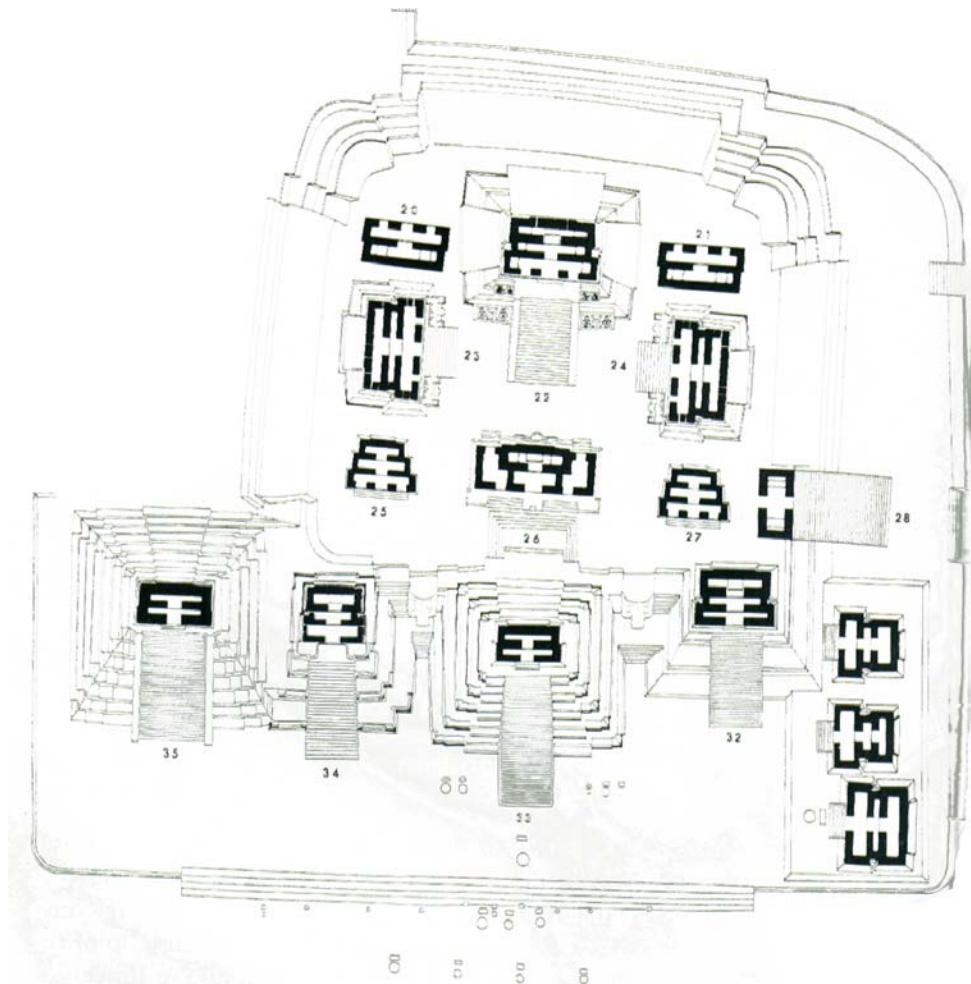
The North Acropolis

Tikal's North Acropolis does not appear to have been used for residence and does not include any palaces. Rather, the functions of the complex appear to be ritual and mortuary. Several burials were found during the Acropolis excavations directed by Coe (1990). The summit buildings of the acropolis are all of the temple type, and appear to have had exclusively ritual and mortuary functions (Coe 1988, 1990). Despite its non-residential nature, examination of the construction history of the North Acropolis is useful for understanding the progress of acropolis construction and the labor-investment decisions made by Tikal's rulers.

Coe's research in the North Acropolis (Figures 16 and 17) revealed a long sequence of construction from the Late Preclassic through the Late Classic. The principal acropolis platform (Platform 5D-4) was added to in a series of at least ten reconstructions. Altogether, these rebuildings greatly increased the size of the

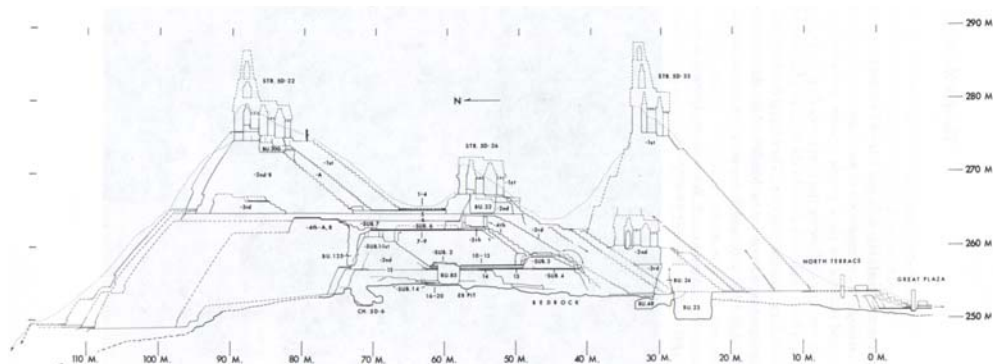
acropolis, changing it from a small platform atop a natural limestone outcrop into one of the largest architectural complexes at Tikal (Coe 1990). The main bulk of the acropolis, a series of platforms, will be discussed below. These platforms constitute the major part of the substructure of the acropolis at any given time, and do not include summit buildings or superstructures.

Figure 16. Plan of Tikal's North Acropolis. Not to Scale
From Coe 1988:42.



The various reconstructions of the North Acropolis platform varied greatly in size and volume. The earliest structure, 1,100 m³ platform 5D-4-10th, was built in the Late Preclassic. It was successively expanded during the same period, with additions measuring 2,345, 6,000, and 2,350 m³ (Coe 1990:21, 37, 50). Each of these platforms was surmounted by anywhere from one to six summit structures. Following these three expansions, a major new version of the acropolis platform (5D-4-7th) was built somewhere between 100 B.C. and A.D. 100. The two phases of this platform totaled 20,860 m³ (Coe 1990:63). In the next phase, sometime during the first century A.D., an additional 7,380 m³ of construction volume were added to the acropolis (Coe 1990:74). It was during this phase that two buildings, 5D-22-6th-B and 5d-26-5th-B, were built on the new North Acropolis summit. These are the earliest buildings that were judged by the excavators to show continuity into the final summit structures of the Late Classic acropolis (Coe 1990:72).

Figure 17. Cross-Section (Facing East) of Tikal's North Acropolis. From Sharer 1994.



In the Protoclassic or earliest part of the Classic Period, sometime around the second century A.D., the acropolis was rebuilt once again. This platform, 5D-4-5th, added 6,115 m³ to the acropolis (Coe 1990:83). Sometime during the Early Classic, the largest single-operation addition to the building was undertaken. 47,000 m³ was added to the earlier platform, resulting in new platform 5D-4-4th-B, and another 7,200 m³ resulted in 5D-4-4th-A (Coe 1990:97).

An inscription dates the next phase of acropolis construction to A.D. 457. By this time, all of the acropolis summit structures are recognized as precursors to the final versions still visible. This operation yielded an additional 9,275 m³ of construction (Coe 1990:117). There were two major platforms succeeding this one. The earlier of the two, 5D-4-2nd, measured 10,330 m³, and is also ascribed to the Early Classic (Coe 1990:136). The later platform, 5D-4-1st, is the final version of the North Acropolis. During the construction of this final platform, the acropolis's volume was increased by a further 8,735 m³ (Coe 1990:155). This final period of construction took place in the Late Classic. Its beginning is placed around A.D. 600 and its end sometime in the eighth century (Coe 1990:13-164). Table 3 and Figure 18 summarize volumetric data on the North Acropolis.

Based on this table, it is clear that labor investment in the North Acropolis was highly variable over time and between particular construction phases. The highest figure, 47,000 m³ of construction volume in platform 5D-4-4th B, probably

represents substantially more energetic cost than any of the structures studied by Abrams at Copán.

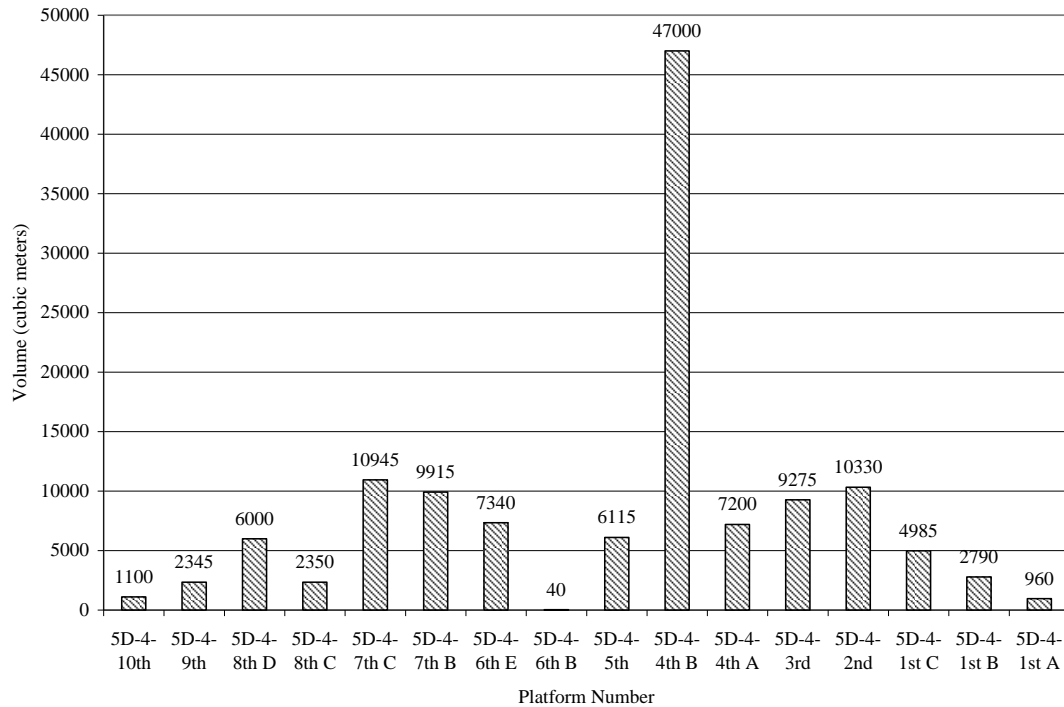
The summit structures of the acropolis also underwent many consecutive reconstructions during the occupation of the site. Some older summit structures were buried beneath platform fill and not continued in a new form. As early as the Protoclassic in some cases, summit structures show definite continuity from older to newer versions, including the final versions still visible on top of the acropolis. The majority of such precursors, though, were not first constructed until the Early Classic.

Table 3. Volumetric Estimates of Tikal North Acropolis Platform Construction Phases.

Phase	Volume (m³) *
Platform 5D-4-10th	1,100
Platform 5D-4-9th	2,345
Platform 5D-4-8th D	6,000
Platform 5D-4-8th C	2,350
Platform 5D-4-7th C	10,945
Platform 5D-4-7th B	9,915
Platform 5D-4-6th E	7,340
Platform 5D-4-6th B	40
Platform 5D-4-5th	6,115
Platform 5D-4-4th B	47,000
Platform 5D-4-4th A	7,200
Platform 5D-4-3rd	9,275
Platform 5D-4-2nd	10,330
Platform 5D-4-1st C	4,985
Platform 5D-4-1st B	2,790
Platform 5D-4-1st A	960

Data from Coe (1990).

Figure 18. Graphic Representation of Volumes of Tikal North Acropolis Platform Construction Phases.

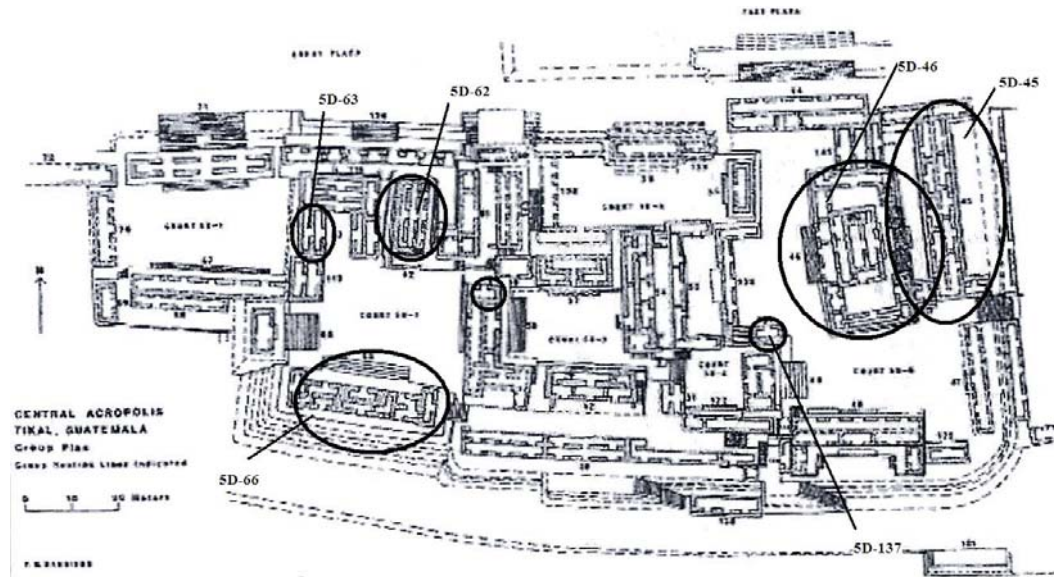


The Central Acropolis

Tikal's Central Acropolis (Figure 19) is believed to contain the residence of the rulers of the city, and is considered Tikal's most important palace (Harrison 1970, 1986, 2003a, 2003b). Harrison's work there included extensive surface clearing and several tunnels and pits into both the acropolis substructure and various summit structures. He found that the summit structures varied greatly in form. Based on these formal variations, he proposed a series of functions for the various range-type

structures he encountered on the Central Acropolis (Harrison 1970:297-320, Table 16; 1986:55-56, Fig. 17).

Figure 19. Plan of the Central Acropolis of Tikal. From Harrison 2003a: Fig. 6.5.



As is evident from Figure 19, the Central Acropolis is a prototypical ancient palace, with buildings arranged around open courtyards of differing degrees of accessibility. The complex is very large, measuring more than 225 m east-west by 80 m north-south. The largest individual structure is 5D-46, often called the Maler Palace (Harrison 1986). This building measures approximately 35 m by 20 m. There are many other buildings on the Central Acropolis. Structure 5D-46 is the largest, but many others, such as Structures 5D-62, 5D-66, and 5D-45 are nearly as large. Smaller Central Acropolis buildings include Structure 5D-63 (approx. 10 m x 6 m),

Structure 5D-69 (approx. 8 m x 3.75 m), Structure 5D-137 (approx. 6.25 m x 3.75 m), and several others.

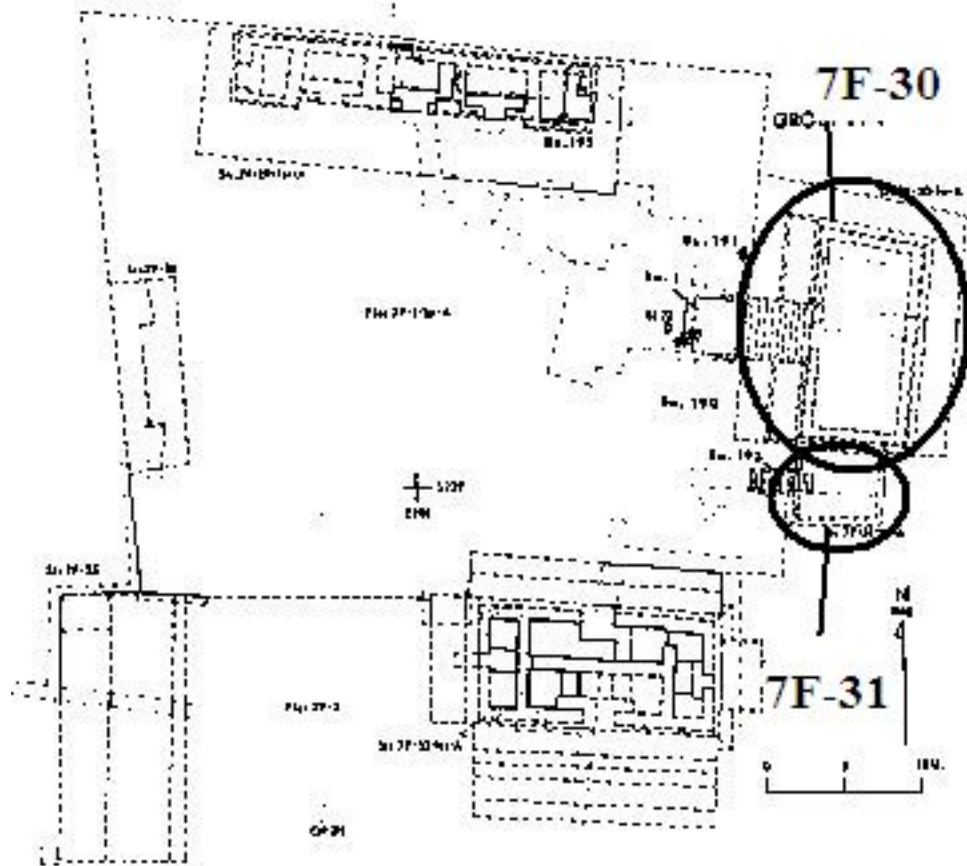
Harrison found that the Central Acropolis had probably seen initial construction in the Early Classic. Buildings from this period were partially razed and covered by later constructions and additions. Like the acropolis at Copán and the North Acropolis of Tikal, the Central Acropolis summit structures show a measure of continuity from the Early Classic through the Late Classic. For example, structures 5D-52-1st and 5D-54-1st are both built on the razed remains of earlier structures 5d-52-2nd and 5d-54-2nd (Harrison 1970:30). This pattern repeats frequently throughout the acropolis complex. Construction phases of the Central acropolis varied greatly in height, extent, and volume. Harrison's sketches (Harrison 1970:Figs. 2-12) and cross-sections (Harrison 1970:Figs. 13-16) indicate this variation. Harrison estimates that the majority of construction phases date to the Late Classic period.

Group 7F-1

Haviland (1981) excavated a non-royal elite residence at Tikal: Group 7F-1 (Figure 20). He identifies this palace as the household of an elite family and their retainers or less affluent relatives. There are two ritual structures (Structures 7F-30 and 7F-31) associated with the residential buildings. In many ways, this group is comparable to the larger non-royal elite groups in the Las Sepulturas area of Copán. Buildings are built of dressed masonry and bore vaulted superstructures. While

smaller than Group 9N-8 at Copán, Tikal Group 7F-1 was probably larger than group 9M-22. Overall, indications are that this was a medium-sized non-royal elite palace.

Figure 20. Tikal Group 7F-1. From Haviland 1981: Fig 5.5.



Comparative Potential of These Data

The volumetric, area, and comparative data presented for all of the structures at Tikal and some at Copán is not as useful as the energetic data from Abrams' experiments. Volumes can be used to estimate energetic cost in some cases (see

Chapter 10), but doing so adds an additional level of inference and imprecision.

Abrams' energetic estimates allow me to rely on well-documented inferences made by Abrams himself (Abrams 1984a, 1994), without the need to add further layers of imprecision to calculations. As will be seen (Chapter 10), better comparisons can be made to structures analyzed by Abrams than to for which energetic estimates are unavailable.

These investigations at Copán and Tikal were accomplished through intensive programs of trenching and tunneling. It is usually neither possible nor necessary to completely excavate large architectural complexes. As will be shown, it is possible to extract useful information using non-intrusive methods of investigation, by examining looter's trenches.

CHAPTER 5

NON-INTRUSIVE STUDIES OF LOOTER'S TRENCHES

Archaeologists have been able to recover significant data through the non-intrusive examination of looter's trench profiles. For example, at Actuncan, Belize, McGovern (1995) profiled several looter's trenches and was able to cast light on the construction histories of four structures through examining the buried construction phases visible in these profiles. At Esperanza, also in Belize, Schubert, Kaphandy, and Garber (2001) discovered a variety of buried construction sequences and related the data to ancient Maya logistical behavior.

Actuncan

At Actuncan, McGovern's research concentrated on a temple, Structure 1 and its basal platform, Structure 4. Based on data recovered from the profiling of three looter's trenches/tunnels, he was able to determine that Structure 4 dated primarily to the Late Preclassic (300 B.C. to A.D. 1), when at least two versions of the pyramid were built, one on top of the other. After the second construction, a platform was added to the top of the structure. In the Classic period (A.D. 250 to 850) Structure 1 was built on this platform. The basal pyramid, Structure 4, was rebuilt for the third time in the Early Classic (A.D. 250 to 600), and again in the Late Classic (A.D. 600 to 850), when it reached its final proportions (McGovern 1995:110-111, 113-120).

At three other structures at Actuncan, McGovern (1995:111-113) also profiled

looter's trenches. In structure 5, a large trench (LT5) exposed four major construction phases. First, a 5.75 m high platform faced with stucco masks was built in the Late Preclassic. In the Early Classic, the structure was expanded and new stucco masks were modeled on its two terraces. In the Late Classic, the masks were covered by an additional expansion. Finally, late in the Late Classic a masonry superstructure was built on top of the platform. In a back room of this structure, which had been penetrated by the looter's trench, McGovern discovered evidence of a possible termination ritual in the form of a 6 cm thick layer made up of thousands of Late to Terminal Classic ceramic sherds burned and deposited in the room and on its stairway.

Smaller looter's trenches at Actuncan also revealed something of the construction histories of two other structures. Several Late Preclassic phases were revealed in Structure 6. Structure 12 was determined to have been built out of large boulders in a single Late Classic construction operation (McGovern 1995:113).

Esperanza

At Esperanza, south of the modern town of San Ignacio, Schubert, Kaphandy, and Garber (2001) investigated and profiles looter's trenches in two structures. They discovered that Structure A-4 had been built and then rebuilt in the Late Classic. The second reconstruction, A-4-1st, was constructed out of unmodified river cobbles. Structure A-4-2nd, the earlier version, was, in contrast, well built of dressed limestone. Structure B, a temple, was built in six construction phases in the Late

Classic period.

Possibilities and Limitations of Looter's Trench Studies

These investigations of pre-existing looter's trenches serve as examples of the kind of data that can be recovered by non-intrusive methods. Both of the above projects, McGovern's at Actuncan and Schubert, Kaphandy, and Garber's at Esperanza, revealed complex construction histories of ritual structures. McGovern was fortunate enough to discover evidence of a probable termination ritual. Each site was placed more firmly into the scheme of Maya chronology. Actuncan was revealed to have a great deal of Late Preclassic construction and an additional growth spurt in the Late Classic, but with continuing occupation throughout the Classic period. The looter's trenches examined at Esperanza revealed that the site was first occupied in the Late Classic, and that rebuilding activity in that short period was relatively intense, as the six phases in Structure B's construction sequence demonstrate.

Neither of these studies of looter's trenches involved volumetric or energetic analysis. In both cases, though, the data gleaned from the looter's trenches could have been used to draw conclusions about the labor costs associated with each structure, based on the comparison of these structures to known cases that have been subjected to rigorous volumetric and/or energetic analysis, like the acropoli at Tikal and Copán. Comparisons could be made to examine a number of relationships, such as the kind, depth, and sorting of fill for core construction episodes, or the amount and quality of facing masonry. When these kinds of construction characteristics are

compared, it will be possible to better understand patterns of labor investment without recourse to intensive excavations.

CHAPTER 6

YALBAC

Location and First Report

The archaeological site of Yalbac is located in central Belize, to the north of the Belize River Valley. Yalbac is a hilltop site (the hill may have been modified by the ancient Maya) on the margin of the valley of Yalbac Creek, a tributary of the Belize River.

Research at Yalbac suggests an occupation stretching from 300 B.C. to as late as A.D. 1500 (Graebner 2002a). The nature of this prolonged occupation is not yet well understood, but there were clearly people living in or near the ceremonial center of Yalbac as early as the Late Preclassic period. At some point during this long history, a number of monumental structures were built at the site center, coupled with the possible artificial leveling of the hilltop.

Yalbac may have first been reported by Thompson in his monograph on the excavations carried out at San José in the 1930s. In that work, he reported that San José could be reached “by a bush road which passes by the depopulated village of Yalbac, close to which there are many mounds” (Thompson 1939:2). It is not clear, however, if he was referring to the location of the modern village of Yalbac (which is near the site) or to some other, now abandoned, locale.

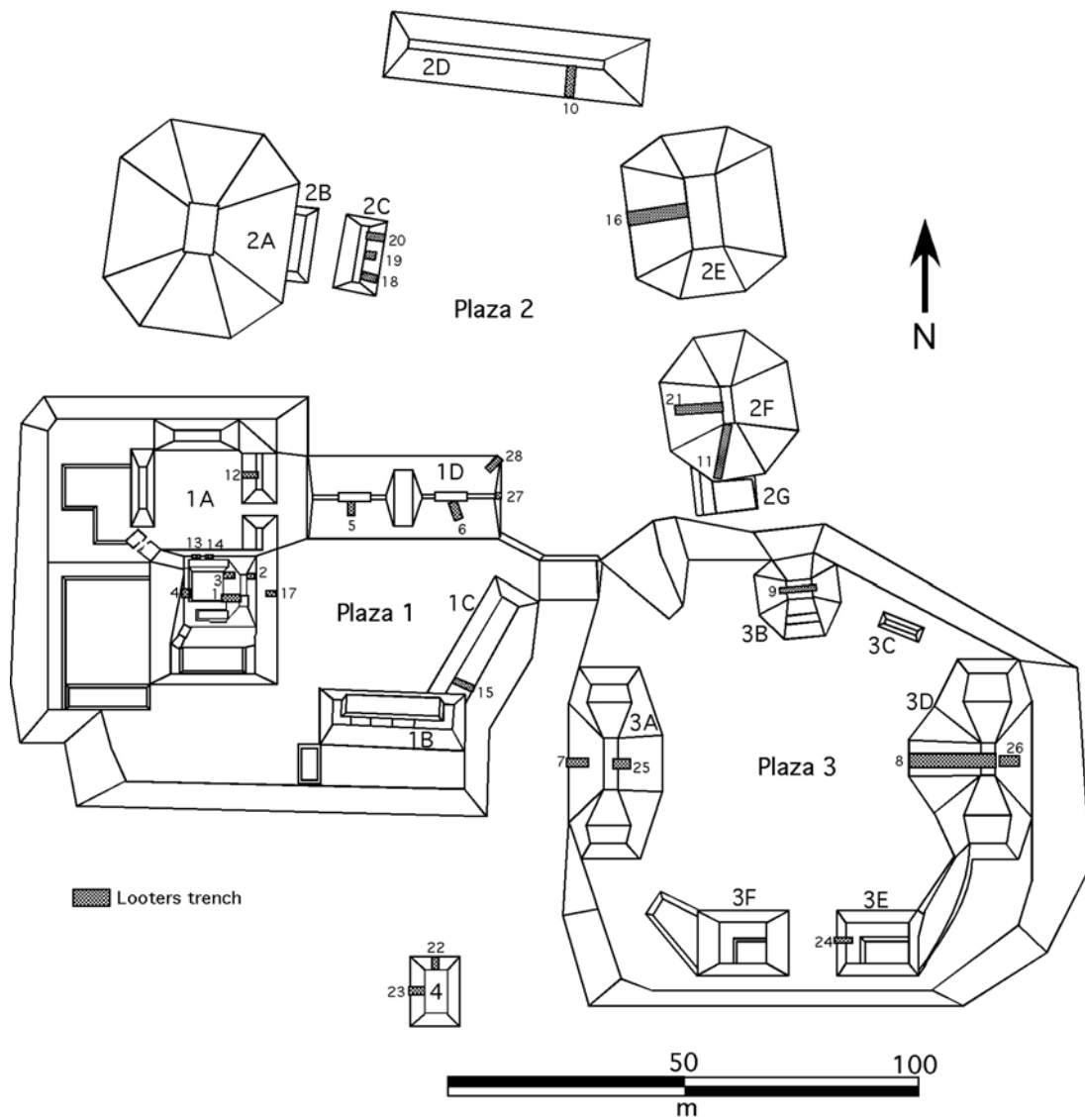
The Valley of Peace Archaeology Project and Yalbac

Yalbac was first recorded in detail by the Valley of Peace Archaeology Project (VOPA) in the 2001 and 2002 field seasons (Lucero [Ed.] 2002, 2003). It was during these seasons that Graebner carried out the mapping of the site core (Graebner 2002a, 2002b; Lucero [Ed.] 2003). In addition some excavations were undertaken.

The VOPA area is located in central Belize, to the north of the Belize River valley. Since 1997, VOPA has conducted a regional settlement survey which has served to link Maya settlement to distinct soils classified according to their suitability for extensive agriculture (Lucero [Ed.] 1997, 1999a; Lucero et al. 2004). Maya settlement in the area appears to be firmly linked to the best soils (Lucero et al. 2004).

Yalbac (Figure 21) is the largest known center in the VOPA project area and is classified as a secondary center (Lucero 2002). It may have served as a local or regional administrative center. The only centers of significant size known in the vicinity of Yalbac are the minor river center of Saturday Creek, 18 km southeast of Yalbac on the Belize River, and the secondary center of San José, about the same distance to the northeast. Saturday Creek is a minor center that was the focus of VOPA investigations from 1999 to 2001, including intensive excavations during the 2001 field season (Lucero [Ed.] 1999b, 2002). San José was the site of well-known excavations by Thompson in the 1930s (Thompson 1939), and is probably best classified as a secondary center, similar in size to Yalbac.

Figure 21. Plan of the Monumental Core of Yalbac. Courtesy of Lisa J. Lucero.



Yalbac is an upland site, well away from the river, but near a perennial stream, Yalbac Creek. Structures at the site are situated largely on soils which fall into VOPA's Classes II (fertile, well-drained upland soils) and III (more marginal, but

still cultivable), along with some poorly drained Class IV soils in the immediate vicinity of the site core. According to Lucero and others (2004:99):

Yalbac's location near water and good land provided the means to sustain large enough populations to build monumental architecture. The core of Yalbac lies on top of a natural, and perhaps modified hill on Class II soils surrounded by Class IV soils [and] nearby pockets of Class II and Class III land. Yalbac Creek provided water for daily needs, as well as a probable trade route.

The mapping of Yalbac's core was carried out in 2001 and 2002, directed by Graebner (Graebner 2002a, 2002b; Lucero [Ed.] 2003). Mapping revealed 19 monumental structures grouped around three large plazas. Plaza 1 is the most restricted of the three, and is the location of the acropolis, which was the particular emphasis of VOPA's 2003 Acropolis Operations. Below and to the east of Plaza 1 is Plaza 3, which is surrounded by several large structures, apparently mainly of the temple-pyramid type. To the north of these two plazas is the larger Plaza 2, the most open and unrestricted at the site. Plaza 2 is surrounded by seven structures, including the largest temple-pyramids at Yalbac, and the ballcourt, which is attached to one of the large ritual buildings.

Previous Valley of Peace Archaeology Project Investigations at Yalbac

In 2001, 1x2 m test pits were placed into the centers of Plazas 2 and 3. Each test pit revealed at least six construction phases. In Plaza 2, dates determined from diagnostic ceramics range from 300 B.C. to A.D. 400. In Plaza 3 dates range from A.D. 1-250 to A.D. 700-900. Diagnostic sherds recovered during hinterland survey

work carried out in 2001 date from ca. A.D. 400 to A.D. 1100-1500 (Graebner 2002a).

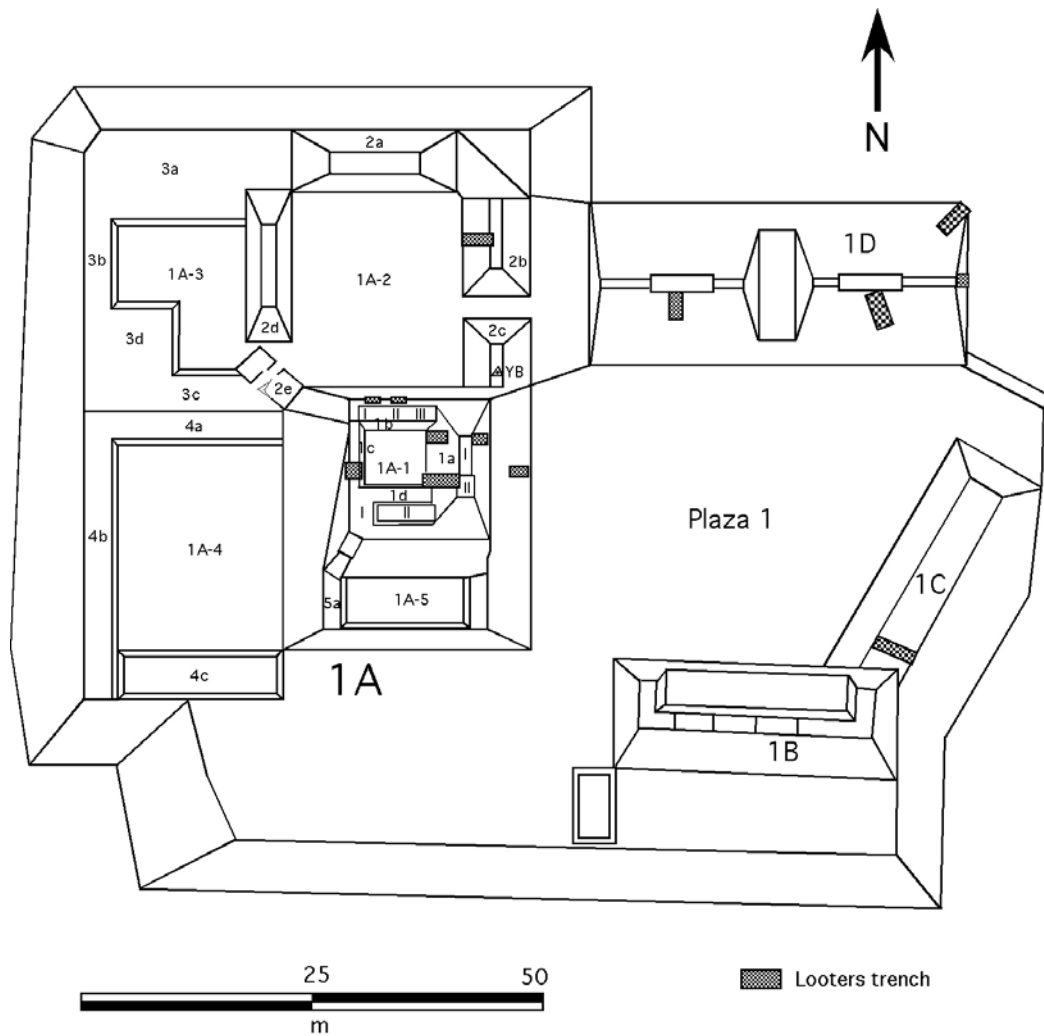
In addition to the excavations, two looter's trenches, LT 8 in Structure 3D (a large temple pyramid on Plaza 3) and LT 16 in Structure 2E (another temple-pyramid on Plaza 2) were cleaned and profiled in 2002. Seven apparent cultural levels were exposed in the profiles of upper and lower LT 8, and it appears that there may be two or more construction phases, although current data are scanty (Lucero [Ed.] 2003:3-4, Fig. 1.4). In LT 16, four cultural levels were observed, possibly representing three construction phases (Lucero [Ed.] 2003:4, Fig. 1.5).

Finally, two residential structures near the site center were excavated during the 2002 season (Graebner and Lucero 2003; Lucero [Ed.] 2003; Lucero and Graebner 2003). These excavations included the investigation of the residence of a wealthy family (Graebner and Lucero 2003). This is the only residence excavated at the site that may provide an additional comparison between labor procurement at Yalbac compared to that at Copán (see below). However, Lucero (personal communication) does not believe that this structure can properly be considered to be a residence of the political elite.

The Acropolis at Yalbac

Structure 1A, the acropolis (Figure 22), is the largest structure at Yalbac in both height and volume of construction. The acropolis substructure dominates the eastern side of Plaza 1, and the southeastern corner of the Yalbac site core. The base

Figure 22. Plan of Yalbac Structure 1A: The Acropolis. Courtesy of Lisa J. Lucero.



of the structure is approximately 45 by 55 m and at its highest point, Structure 1A-1a-II, it towers to more than 20 m (Graebner 2002b). There appear to be 21 distinct buildings resting on this massive substructure, each facing one of five sunken courtyards (Lucero [Ed.] 2003:Fig. 1.3). The highest courtyard, 1A-1, is flanked by the most exclusive buildings at the site: 1A-1a-I, 1A-1a-II, 1A-1b, 1A-1c, and 1A-1d. Three courtyards on the next lower level can be ranked visually in order of

exclusivity: 1A-2, 1A-3, and 1A-4. The smallest courtyard, 1A-5, clings to the south slope of the substructure below courtyard 1A-1 and above a southeastern extension of Plaza 1 (Lucero [Ed.] 2003:Figs. 1.1 and 1.3).

Structure 1A is penetrated by eight looter's trenches (LTs) located at various levels from the structure's base to summit (Graebner 2002b:51-53). According to Graebner (2002b:30, 32), "the most revealing looters trenches, LT 1 and LT 2, both located at the top of the acropolis, have exposed two rooms in LT 1, one with an intact corbel arch ceiling and red-plastered walls, and an additional room in LT 2 that contains a bench overlooking Plaza 1."

Besides LT1 and LT2 in the uppermost courtyard of the acropolis, looter's trenches 3, 4, 12, 13, 14, and 17 also intrude into the acropolis (Graebner 2002b:51-53). Of these, the majority are excavated into the sides and bottom of the structure, with only one, LT 3, joining LT 1 and LT 2 in intruding into the top of the acropolis. These trenches were the focus of the 2003 VOPA looter's trench operations.

The Yalbac Acropolis as a Palace

The evidence of vaulted architecture and a bench in LTs 1 and 2 lead Graebner to conclude that, "the primary royal residence of Yalbac is located on the extreme top of the acropolis, with the front of the structure facing the open area of Plaza 1 to the east, more than twenty meters below" (2002b:38). He bases this conclusion on the presence of the bench, corbel arch ceilings, and the existence of a

multi-room structure, which together are taken to indicate that the buildings around courtyard 1A-1 are the principal palace of Yalbac.

Graebner's identification of the acropolis summit structures as the residences and associated buildings of Yalbac's ruling dynasty seems secure. He may be mistaken about Structure 1A-1a being a single, multi-room, range-type structure (it now seems more likely that there are two structures, 1A-1a-I and 1A-1a-II). Even so, it is likely that multi-room range structures, the type that Andrews (1975:43-46) most closely associates with Maya palaces, are present beneath other mounds around the acropolis courtyards.

The structures on the Yalbac Acropolis share many characteristics with other ancient palaces. Five open courtyards provide light and air, as well as central foci for the acropolis summit structures. These courtyards vary in terms of their accessibility, but access to all of them is restricted. The relative restriction appears to progress from the more open Courtyard 1A-2 to the most restricted 1A-1. This kind of structural ground plan fits well with those observed for palaces in early states worldwide (Flannery 1998).

Structure 1A's Courtyard arrangement is also similar to that observed at many other complexes that have been identified as palaces at other Maya centers. Such well-known palace complexes as the Palace at Palenque, Structure IV at Becán, the Caana at Caracol, and the Murciélagos Complex at Dos Pilas are all made up of a number of structures arranged around open courtyards. The courtyards show varying degrees of accessibility, implying a hierarchy of restriction among them. The Central

Acropolis at Tikal and the Late Classic royal residence at Copán, Group 10L-2, also follow this general pattern.

Based on the similarity between Structure 1A and palaces in many other ancient states and at other Maya centers, I believe that the acropolis at Yalbac served as the palace of the elite family who ruled the site. It is likely to have served a variety of functions, including residence for the ruling lineage, their relatives and retainers, polity-administrative functions, and maybe ritual and storage functions as well. Flannery (1998) notes that all of these needs are frequently met by the palace structures of early states.

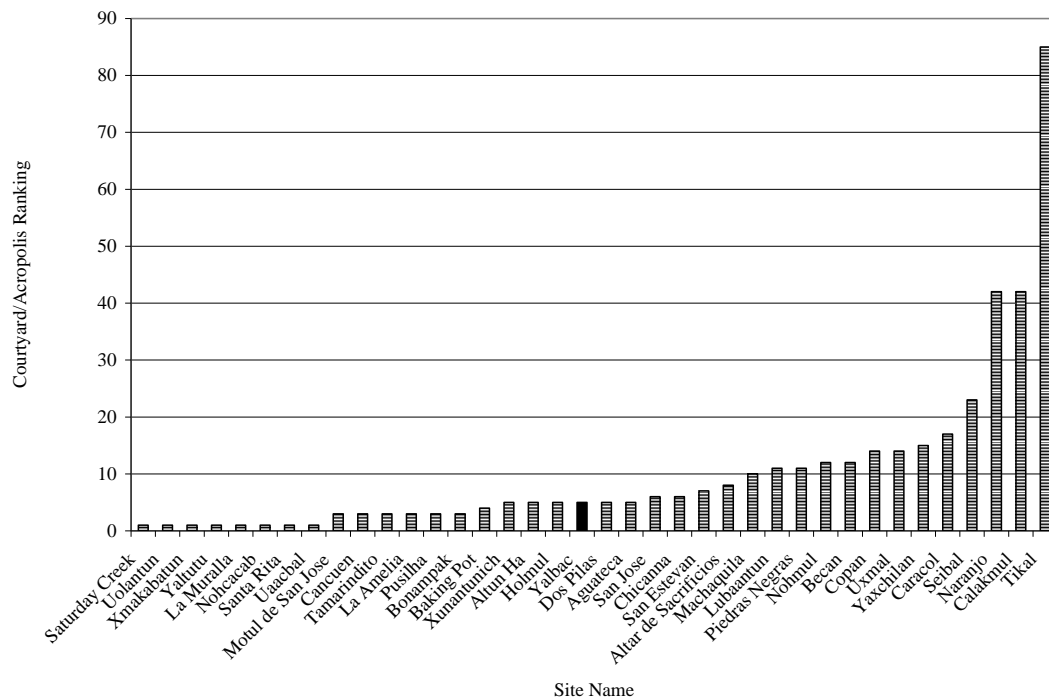
Yalbac in the Ancient Maya World

I do not mean to imply, by the identification of the Yalbac Acropolis as a palace, that Yalbac was the capital of a state. The political situation of Yalbac is unresolved. It is possible that a small polity was centered at the site. Alternatively, it may have served as secondary center governing a local area within a larger polity. In the latter case, the ruling family at Yalbac may have been subservient to (and possibly related to) a royal lineage at a larger polity capital. They may have been analogous to the *batabob* identified by Williams-Beck (1998) at Postclassic centers in the Puuc region of Campeche, or the *sajalob* discussed by Martin and Grube (2000) and Houston and Stuart (2001) in regards to secondary centers in the Maya Lowlands. In both cases, these secondary ruling dynasties are frequently subservient to a *K'uhul*

Ajaw (“Holy Lord” [Houston and Stuart 2001]), who maintains his own royal palace at the polity capital.

Applying the Adams and Jones (1981) courtyard-count ranking method to Yalbac, which has three courtyard groups (Plazas 1, 2, and 3) and one acropolis (Structure 1A), earns a total of five points in the ranking system (Figure 23). This

Figure 23. Courtyard/Acropolis Ranking of Maya Sites. Data from Adams and Jones 1981 Except as Indicated in Text.



places Yalbac very much in the middle of the ranking, a position consistent with Lucero’s (2002) identification of the site as a secondary center. As in the case of Figure 9 (Chapter 2), the rankings of sites not analyzed by Adams and Jones (Copán,

Saturday Creek, and Yalbac) have been estimated from site maps using their method. The position of Yalbac in this site ranking is shown by the red column in Figure 23.

As can be seen in Figure 23, Yalbac is considerably lower in the site ranking than either Copán or Tikal. The differences—in terms of population, resource-base, and political power—between these three centers were surely considerable. As will be discussed, these difficult-to-assess differences will affect the analysis presented here.

Unfortunately, Marcus (1976, 1993) does not address political organization outside of the six central states of Copán, Tikal, Palenque, Calakmul, Yaxchilán, and the Petexbatún region. In the area of Central and Eastern Belize (where Yalbac is located), for example, there is no indication in Marcus' work of a regional capital and no discussion of what state might have administered the area. The two principal regional centers in the Yalbac region which have been identified as possible state capitals are Caracol (Chase and Chase 1987) and Naranjo (Ball 1993). Either one of these could have been, at least at some time, the capital of the polity in which Yalbac was a secondary center. As discussed above, though, there is no way to determine at the moment which of these two centers would be a better candidate or if some other center should be considered. Indeed, the dynamic nature of Maya politics suggests that any number of political hierarchical organizations could have embraced Yalbac at different points in its history.

CHAPTER 7

VALLEY OF PEACE ARCHAEOLOGY PROJECT 2003 ACROPOLIS OPERATIONS

Introduction to 2003 Acropolis Operations

The work undertaken during the 2003 VOPA operations on Yalbac's Acropolis comprised the clearing, profiling, and photographing of the eight major looter's trenches. This work was carried out between June 11 and June 27, 2003.

Methods

The eight looter's trenches were all cleared with shovels and trowels of as much as possible of the looter's backdirt. In LTs 3, 4, 12, 13, 14, and 17, we are confident that all of the backdirt was cleared and the original boundaries of each trench revealed. In LTs 1 and 2, it was not possible to judge where the looter's backfilling ended, and clearing was curtailed at an appropriate level for profiling walls in each room and the bench in LT 2. In LT 1, in particular, further clearing might reveal more of the lower walls of the rooms that are currently covered.

In order to establish the three-dimensional positions of each looter's trench, we used a Brunton Pocket Transit, a sight level, and tape to measure in nails we placed in architectural features or trees in or near each looter's trench. All measurements were taken from traverse point YB, a concrete-and-rebar marker placed by VOPA during the mapping of the site in 2001 (noted on Figures 22 and 24). The nails were also used, where possible, as guides for drawing profiles. Where

necessary, additional nails were placed in more appropriate locations for profiling lines, using the initial nails as points of reference.

Before the placement of string for profiling lines, photographs were taken of all the trenches. In each case, slide and digital photographs were taken. Overview shots and profile shots were taken, as well as shots of details of interest, such as floors or the bench in LT 2. Each shot taken with the digital camera was matched with a color slide photograph taken from the same angle.

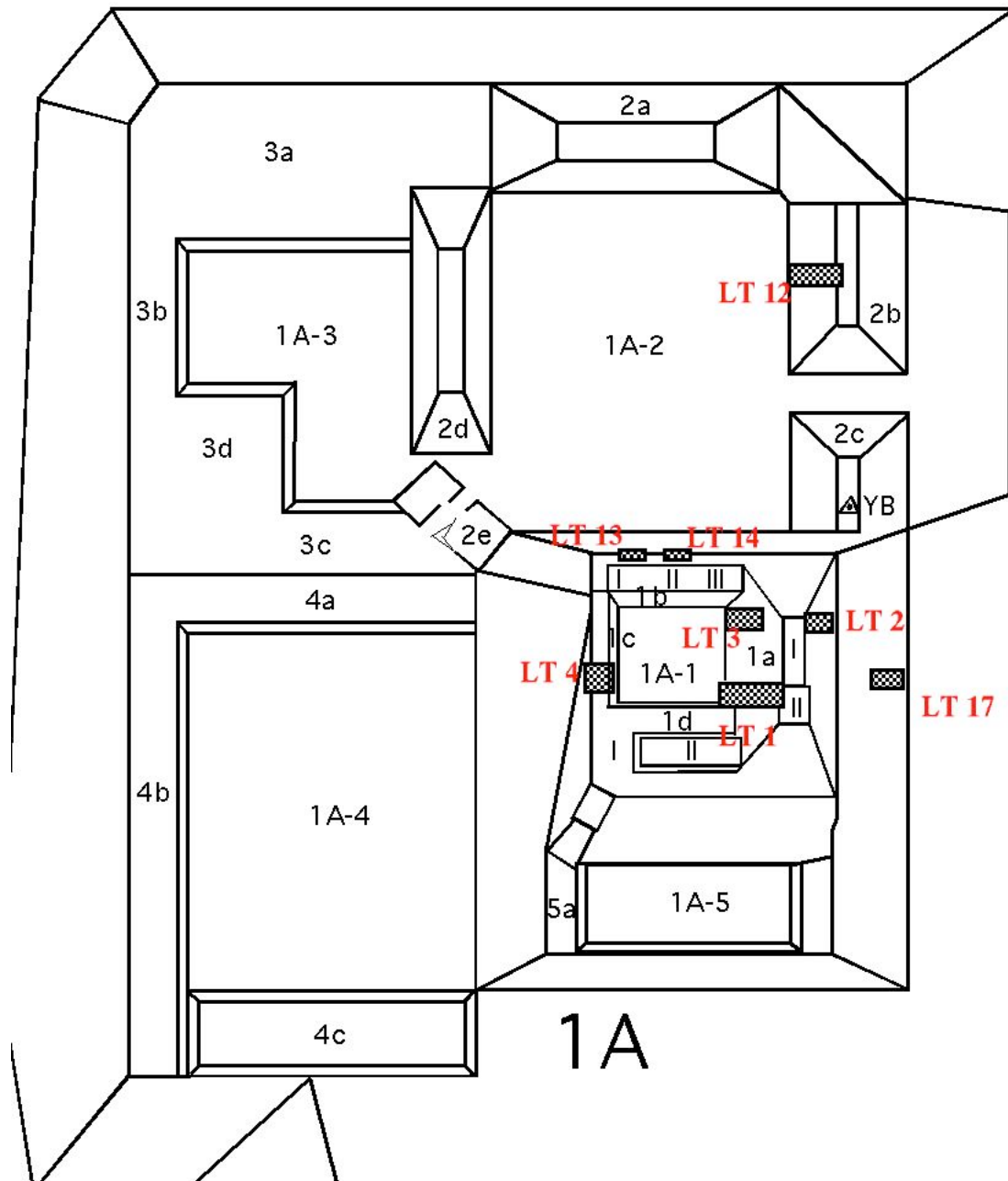
Profiling lines were established by running level strings (strings placed using line levels) around the inside of each trench. The varying complexity of the trenches led to some profiling lines being easier to establish than others. Nails and chaining pins were used to anchor the strings in the corners of the trenches and rooms.

Once the photographs had been taken and the level string for profiling laid out, the plans and profiles of the trenches were drawn to 1/20th scale. In most cases, a plan view and one profile view were drawn for each trench. Rather than drawing one particular profile of each trench (such as always drawing the south or west profile), it was decided to draw the most informative wall. In LT 1 and LT 2 numerous profiles were drawn because of the complexity of those trenches and the numerous details and features of interest that are present in them.

Looter's Trench Locations

The eight looter's trenches are found on various parts of the acropolis. Figure 24 is a plan of Structure 1A with the looter's trenches labeled.

Figure 24. Yalbac Structure 1A with Looter's Trenches Labeled.
 Courtesy of Lisa J. Lucero.



LT 1, LT 2, and LT 3 intrude into the two large summit structures, Structures 1A-1a-I and 1A-1a-II, on the east side of Courtyard 1A-1 (Figures 25 and 26). Looter's trenches 4, 13, and 14, as mentioned, are in the upper part of the platform supporting Courtyard 1A-1. LT 4 is on the steep west slope of the platform, near its southwest corner. This small LT is located only slightly below Courtyard 1A-1. LTs 13 and 14 are in the center of the more gradual north slope. Both are above Courtyard 1A-2, somewhat more than halfway upslope toward Courtyard 1A-1 (Figure 27).

Figure 25. Structures 1A-1a-I and 1A-1a-II. LT 1 is Under the Palm-Frond Roof, the East Edge of LT 3 is Visible in the Bottom Center of the Photograph



Figure 26. Structure 1A-1a-I from the North.
LT 2 is Under the Palm-Frond Roof.



Figure 27. The North Slope of the Courtyard 1A-1
Platform. LT 13 is in the Upper Right.
LT 14 is Lower and to the Left.



LT 12 is below the Courtyard 1A-1 platform. It is located in Structure 1A-2b, in the northeast corner of Courtyard 1A-2. The Structure (Figure 28) has been trenched axially.

Figure 28. LT 12 in Structure 1A-2b.



Finally, LT 17 is at the base of the acropolis, in the center of its east slope. The entrance to this trench is at approximately the elevation of Plaza 1. The entrance to LT 17 is shown in Figure 29.

Figure 29. LT 17 from Plaza 1.



The approximate locations and elevations of the various looter's trenches are given in Table 4. Coordinates given are in relation to Field Station YB, which is located on the summit of Structure 1A-2c, in the southeast corner of Courtyard 1A-2.

These locations are for specific points in each looter's trench. In each case, the coordinates and elevations given here are for the principal nail emplaced in architecture in each trench as a guide for the profiling operations.

Table 4. Looter's Trench Coordinates.

Trench or Point	Elev. (masl)	X-Coordinate (YB +/- m) ^a	Y-Coordinate (YB +/- m) ^b
<hr/>			
Station YB	81.55	0.00	0.00
LT 1	86.96	-10.48	-17.70
LT 2	84.42	-4.39	-8.42
LT 3	86.71	-9.75	-8.74
LT 4	82.97	-6.92	-13.11
LT 13	84.96	-21.21	-19.03
LT 14	83.64	-14.69	-5.05
LT 12	80.18	+0.64	+12.29
LT 17	76.49	+4.58	-15.91

^a A + in this column indicates that the point is east of YB, a – indicates that it is west.

^b A + in this column indicates that the point is north of YB, a – indicates that it is south.

Results of the 2003 Looter's Trench Operations

Figure 30 provides a key to the looter's trench profiles which appear throughout this chapter.

Figure 30. Legend for the Looter's Trench Profiles



= Humus Layer (10 YR 7/2 Clay Loam)



= Collapse Debris



= Roots



= Plaster Floor or Bench (Horizontal Plaster Surface)



= Lime Mortar (Usually 10 YR 7/2 with varying percentages of gravels and cobbles)



= Unpainted Plastered Wall Surface (10 YR 8/4)



= Eroded Plastered Wall Surface



= Red Painted Plastered Wall Surface (10 R 4/4)



= Rocks



= Hole or Tunnel Entrance

Looter's Trench 1

This trench reveals more architectural data than any of the other acropolis LTs. The interiors of two rooms were encountered by the looters, along with a small portion of a third (Figure 31). One room (LT 1, Room 1) was located on the south side of courtyard 1A-1, with its long axis running north-south, and its short axis running east-west (Figures 32, 33, 34). This room is probably best interpreted as part of Building 1A-1a-II, which dominated the southeastern corner of elevated courtyard 1A-1. The long (north-south) axis of this room is oriented east-west (273° east of Magnetic North), and its short, east-west, axis runs True North (3° east of Magnetic North). The dimensions of the room are 2.18 m along its long axis, and 1.70 m along its short axis.

Figure 31. Schematic Plan of LT 1.

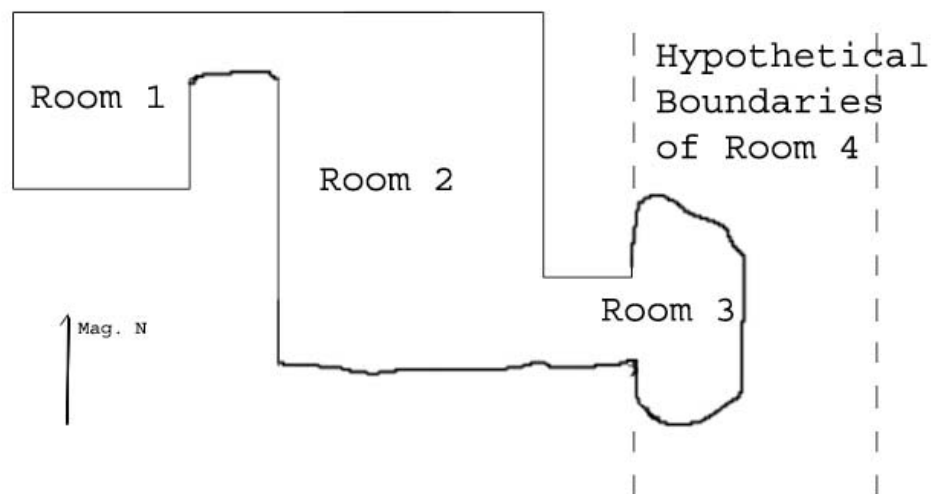


Figure 32. LT 1, Room 1: South and West Profiles.

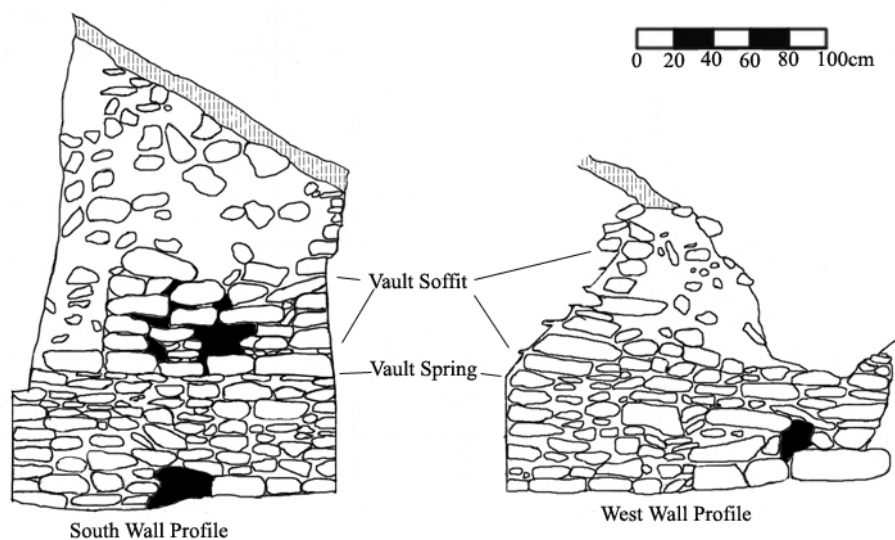


Figure 33. LT 1, Room 1: East Profile.

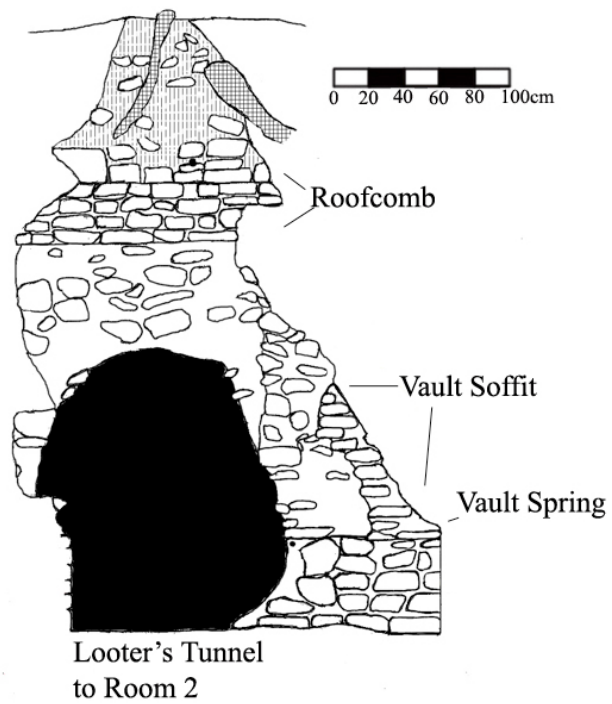
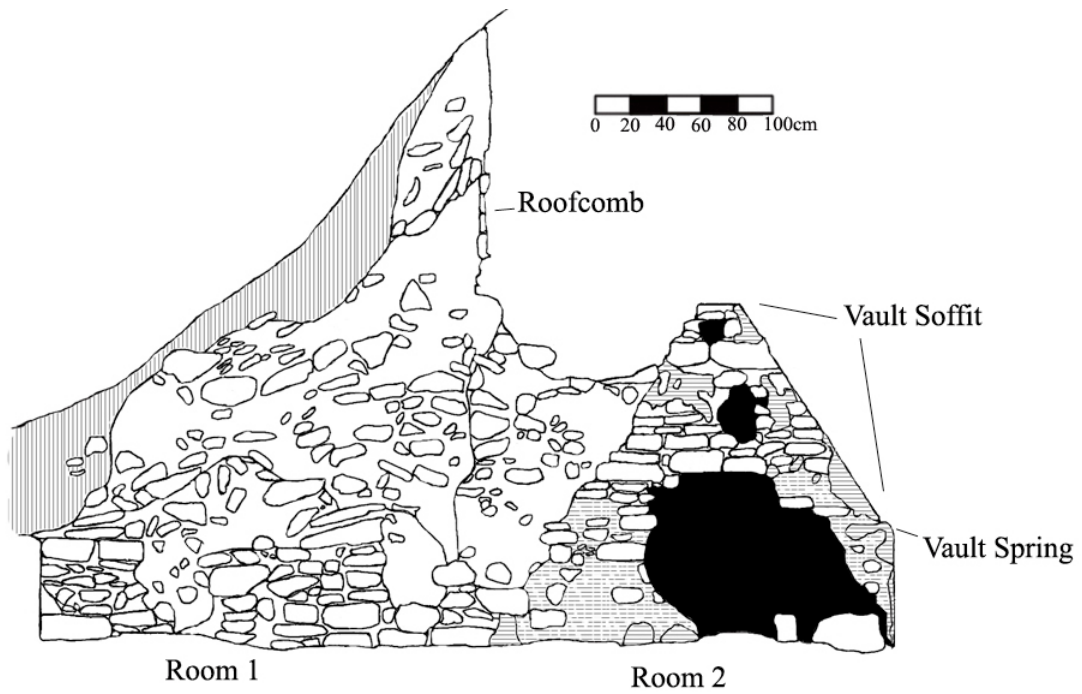


Figure 34. LT 1, Rooms 1 & 2: North Profile.



A door ran through the eastern wall of this structure into another room (LT 1, Room 2). The looters encountered the top of the arch this doorway and expanded it by breaking away the southern doorjamb, forming a roughly oval tunnel into Room 2 (Figures 33 and 34). Above this tunnel are the remains of a molding and masonry work. I hypothesize that this is the base of a masonry roofcomb resting on the roof of Structure 1A-1a-II above Room 2 (this possible roofcomb can be seen behind the tree in Figure 35).

Room 2 (Figures 36, 37, and 38) is a well preserved room featuring a complete corbel arch and capstone ceiling. The long axis of this room runs east-west

Figure 35. LT 1: Tunnel from Room 1 to Room 2.
Note the Roofcomb Behind the Tree
in Center of Photograph.



and its short axis runs north-south. Eroded plaster is visible all over the walls and vault soffit of this room. Along the upper parts of the walls, not far below the vault spring, there is plaster on which red paint is still evident (Figure 37). The exact dimensions of this room are unknown; the current southern boundary of the looter's trench in Room 2 is comprised of a wall of hard-packed mortar with pebbles and cobbles, evidently indicating that the whole room had once been intentionally filled by the ancient Maya. The looters removed this fill from the northern part of the room, but left it in the southern part. Evidently, they decided to extend their excavation eastward and downward through a sealed doorway. The orientation of this room is the same as that for Room 1, as described above. Its exposed dimensions are 3 m along its long (east-west) axis, and 1.82 m along its short (north-south) axis.

Figure 36. LT 1, Room 2: West Profile.

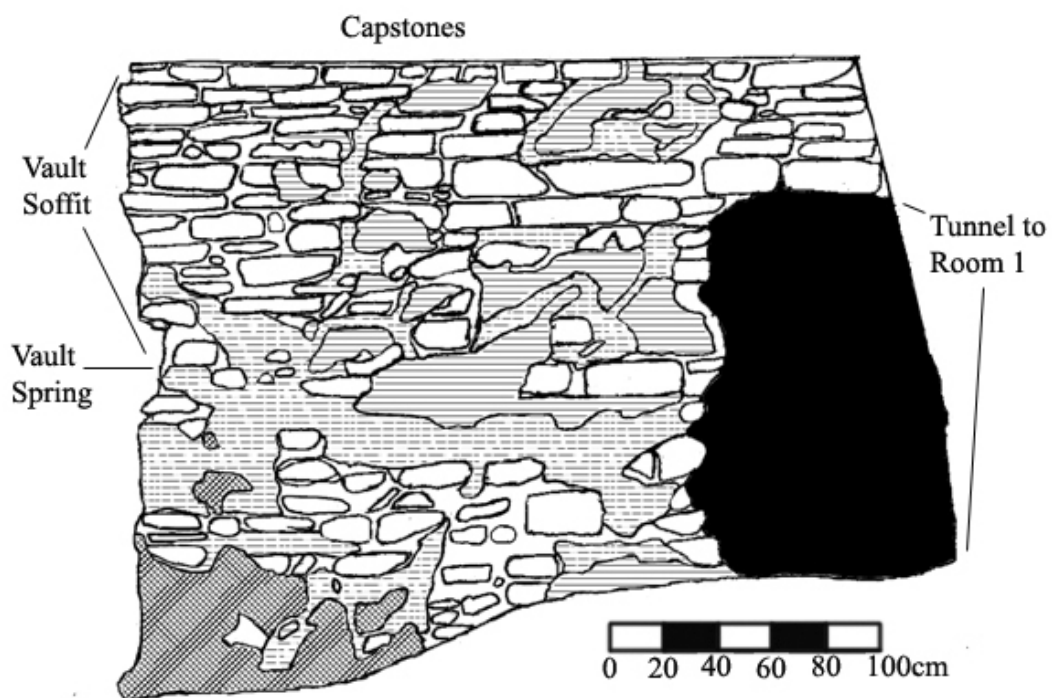
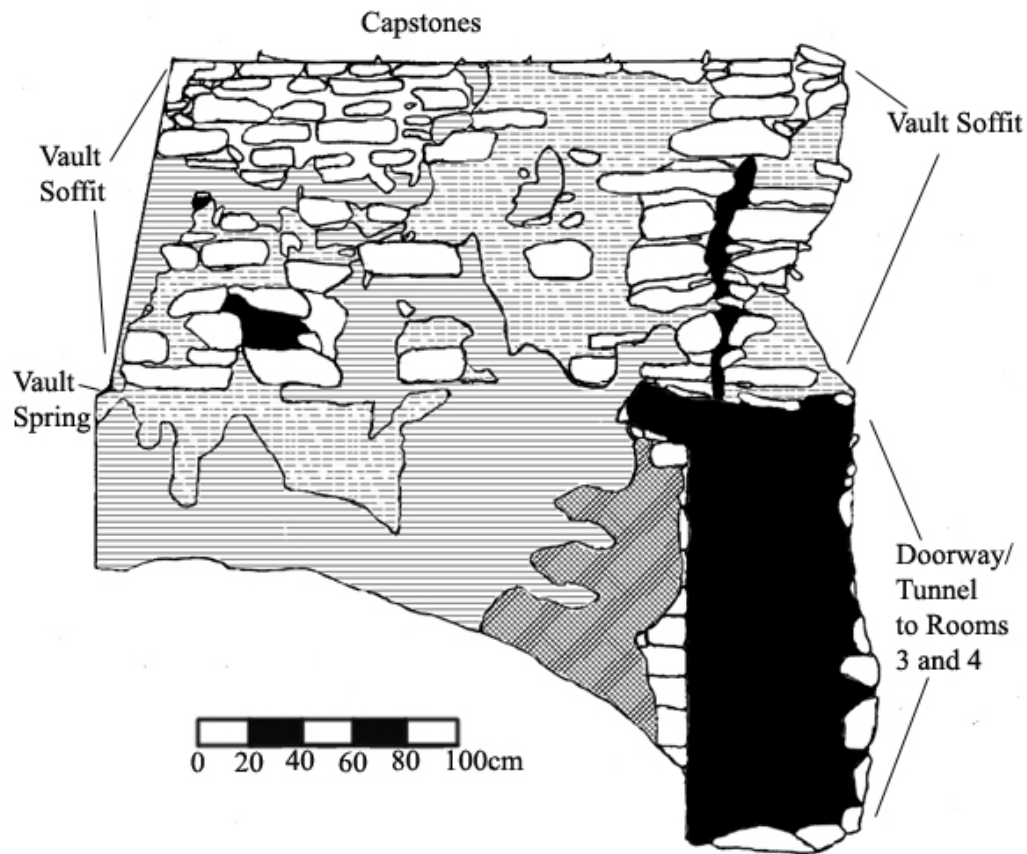


Figure 37. LT1, Room 2: West Wall. Dr. Lisa J. Lucero
Indicates Area with Red Painted Plaster.



Figure 38. LT 1, Room 2: East Profile.



The sealed doorway through which the looters dug is clearly visible in the tunnel connecting LT 1, Room 2 and LT 1, Rooms 3 and 4. The northern side of this tunnel is made of neatly cut and dressed masonry while the southern side is comprised of rough boulders (Figure 39). The northern wall, obviously a doorjamb, terminates abruptly at what is evidently another filled-in room (LT 1, Room 4). The southern wall of the tunnel runs into Room 4; at the boundary is a row of boulders with dressed sides facing Room 4 (Figure 40). Evidently, this doorway was sealed while Room 4 remained in use. The tunnel is 1.74 m long.

Only a small portion of Room 4 was exposed by looters (this is visible in the extreme right of the north wall profile and the extreme left of the south wall profile, Figure 39). This is because the looters excavated down from Room 2 through the

Figure 39. LT 1, Tunnel from Room 2 to Rooms 3 and 4: North and South Profiles.

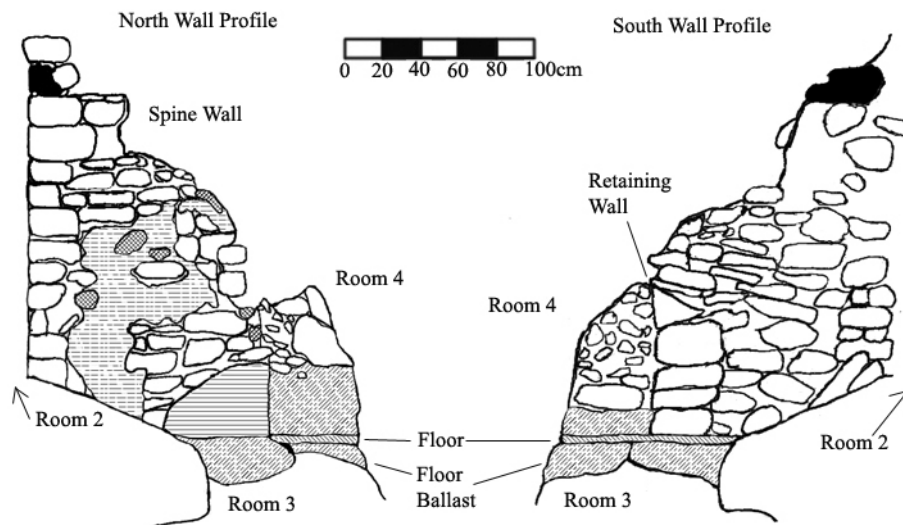


Figure 40. LT 1, Tunnel from Room 2 to Rooms 3 and 4: Boulder Retaining Wall on South Side of Tunnel.



floor in the tunnel and Room 4. They then continued the excavation downward into the structural core. The visible part of Room 4 is simply mortar, cobble, and pebble fill. It is impossible to tell if the whole room was filled in with this material. An interesting possibility is that what can be seen of Room 4 is the core of a bench abutting the back wall of the room. This possibility is suggested because of the presence of a bench in this position in LT 2, which probably exposes part of another room in the same range of rooms, but at its north end. Room 4's dimensions and orientation are unknown, but may well prove similar to those of Room 2.

The looter's trench continues into what has been designated LT 1, Room 3. This is now recognized as simply a space in the structural core cleared by the looters. In the clearing process, numerous large boulders must have been removed. At the back of this space, the looters contacted and broke through a wall (Figures 41 and 42).

Figure 41. LT 1, Room 3: East Profile Showing
Upper Zone of Buried Structure.

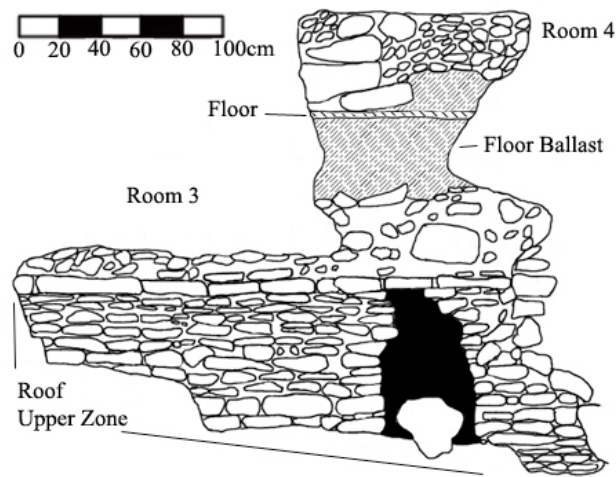


Figure 42. LT 1, Room 3: Upper Zone of Buried Structure at East End of Trench.



This wall, made of cut and dressed masonry and mortar, features smaller individual stones than are seen in Rooms 1, 2, the doorway, or Room 4. This wall may represent the exterior of the upper zone (outer façade of the roof, from vault-spring to capstone-level) of a buried structure. If so, it appears that this older building was buried intact in the structural core on which Courtyard 1A-1 was constructed.

The portion of the wall visible in Room 3 is 2.88 m long and is oriented to True North.

LT 1 reveals more architectural detail than any other trench investigated. In all of the walls of Rooms 1 and 2 the masonry stones are dressed only on the facing side. The other sides of the stones are left rough. This makes for a poor fit between stones. The builders compensated for this by laying the stones in thick mortar. In Room 1, for instance, there are areas where the mortar must originally have been as much as 0.08 m thick between rows of stones. In Rooms 1 and 2, the vault soffits are clearly marked by a row of large, flat stones of about even thickness. These are the first row of corbelled stones in each case. In Room 1, this line of corbelled stones sits on a row of very thin, flat stones, evidently intended to provide a level surface for the vault to rest on. As mentioned above, the wall in Room 3 is made of generally smaller stones than were used in construction in Rooms 1 or 2. The masonry of this wall also appears finer, with less space between the stones and correspondingly less mortar. A row of flat stones at the top of the wall may well have anchored the structure's superior molding.

Unfortunately, no chronologically diagnostic artifacts of any kind were found in LT 1. Three sherds found in Rooms 2 and 3 could not be identified as to type.

Looter's Trench 2

This trench is located on the east face of Building 1A-1a-I, near its northeast corner, overlooking Plaza 1. The trench partially exposes one room (Figures 43 and

44). At the beginning of the trench (its eastern end) the remains of two doorjambs have been exposed. Apparently, the looters contacted and reopened a doorway into the room beyond.

The room measures 2.02 m east-west by 1.80 m north-south, and is 2.74 m high. Its long (north-south) axis is oriented to True North. Its short (east-west) axis is oriented east-west (273°). From the doorjamb, the looters continued their

Figure 43. LT 2: Planview.

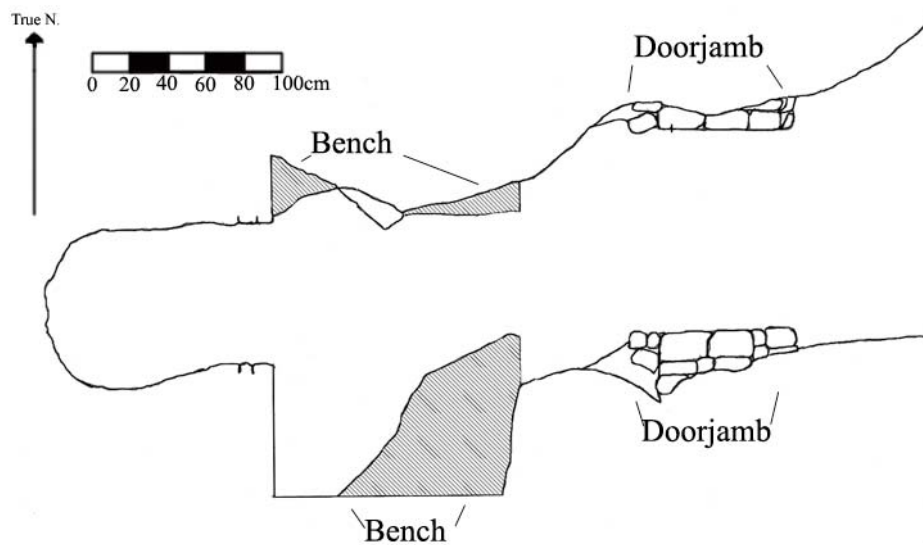
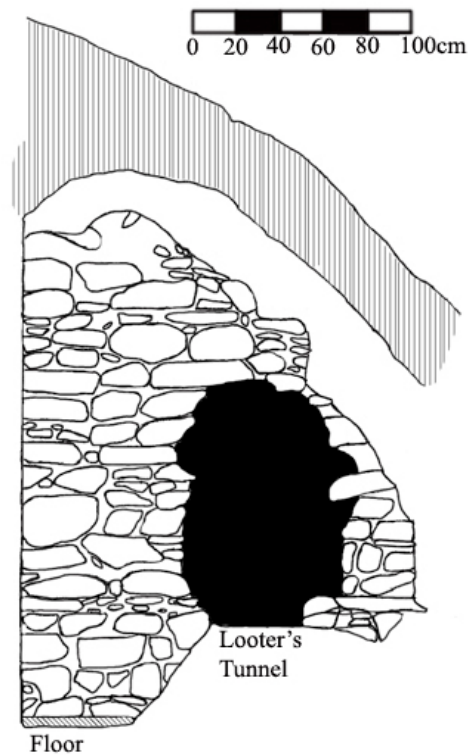


Figure 44. LT 2: West Profile.



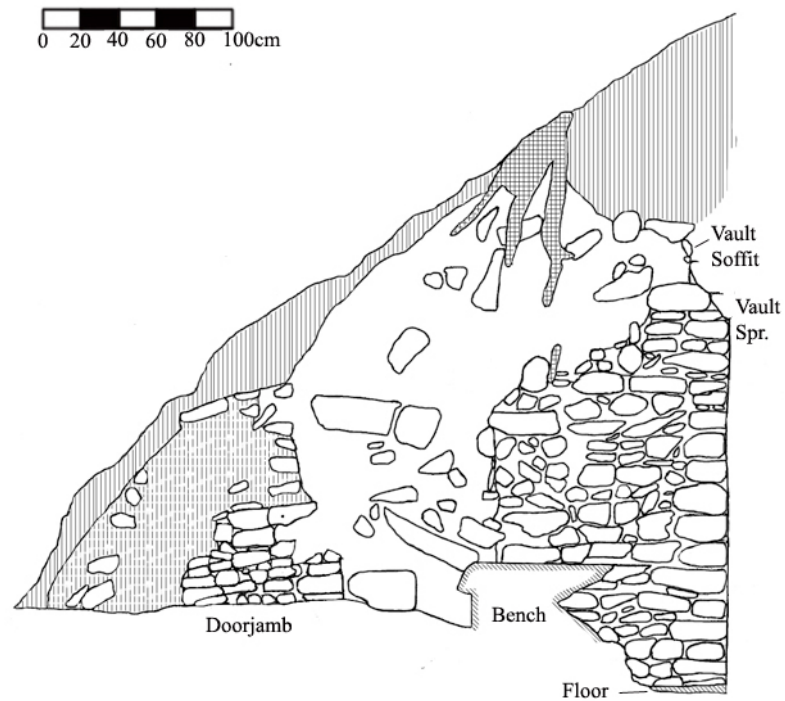
excavation all the way to the back wall (Figure 44), which they proceeded to break through and dig into. All they exposed in this tunnel was wall core; they did not reach any other room. The looter's also turned their attention to the most interesting feature exposed in the trench.

This feature is a plastered bench abutting the back wall of the room (Figure 45). The looters broke through the top of the bench and excavated downward through it, contacting (and breaking through) the floor of the room 0.70 m below the surface of the bench (Figure 46), and continuing for an unknown distance (probably not very far, given the size of the excavation) beyond. The bench itself, then, is 0.70 m high and 1.42 m deep. At its edge, the plaster is curved over to form a lip or molding.

Figure 45: LT 2: Oblique View (Facing SW) Showing Bench.



Figure 46. LT 2: South Profile. Note the Floor Below the Bench.



Masonry in this room is similar in all respects to that in Rooms 1 and 2 of LT

1. No chronologically diagnostic artifacts were found.

Looter's Trench 3

LT 3 is the last looter's trench penetrating the summit buildings of Courtyard 1A-1 (Figures 47 and 48). It is excavated into the west (courtyard) face of Building 1A-1a-I, not quite opposite LT 2, LT 3 being slightly offset to the south. After clearing, LT 3 proved to be about 3.94 m long, 1.84 m wide and 1.44 m deep. The only feature present in this trench is a masonry wall, broken through by looters. The

Figure 47. LT 3: Planview.

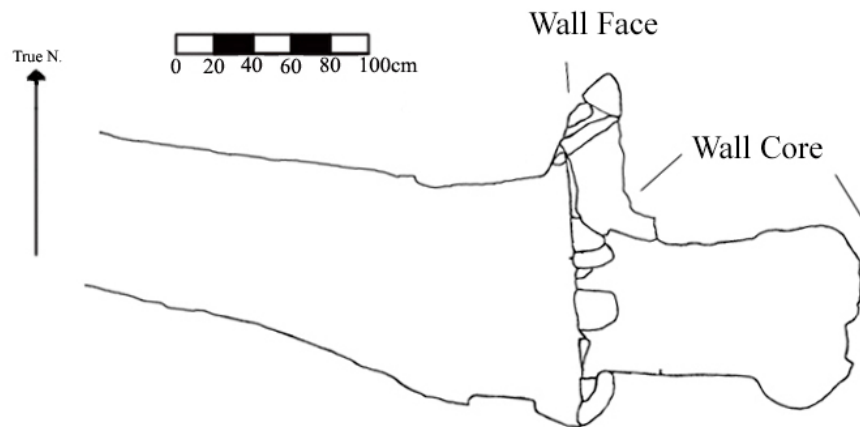
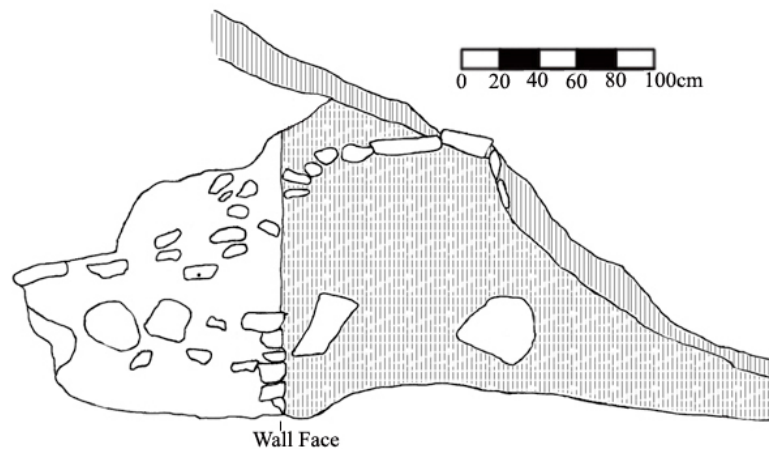


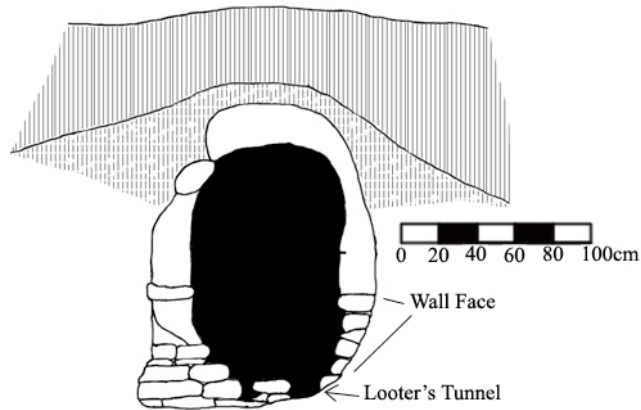
Figure 48. LT 3: South Profile.



wall (Figure 49) is approximately 1.24 m from the back of the trench and measures 0.52 m high; it is oriented east-west (273° east of Magnetic North). The stones are placed with their dressed side facing west, and cemented into a mix of lime mortar, cobbles, and boulders. Most likely, these stones represent the original west-facing wall of Building 1A-1a-I, and the mortar fill behind them is the wall core. If so, then this looter's trench never penetrated into the building's interior. What masonry is

visible seems very similar to that seen in LT 2 and in LT 1, Rooms 1 and 2. No chronologically diagnostic artifacts were found in LT 3.

Figure 49. LT 3: East Profile at Plane of Faced Masonry Wall.



Looter's Trench 4

This trench (Figures 50 and 51) is located on the steep western slope of the Courtyard 1A-1 platform, above Courtyard 1A-4. There are several locations nearby where the looters may have begun excavations, but only this one trench actually penetrates into the structure. The trench is 1.24 m long, 2.08 m wide and 1.46 m deep.

A wall is exposed in this trench. It is likely that it is the facing of the topmost terrace on the acropolis. It is in a very poor state of preservation, due to the looting activity, so it is impossible to tell its original height. It appears to be oriented to True North, which would be consistent with structural orientations elsewhere on the

acropolis. The wall rests on a layer of lime mortar, which may include some large and eroded chalky limestone boulders. Possibly, this layer represents the surface of the next lower terrace.

Figure 50. LT 4: Planview.

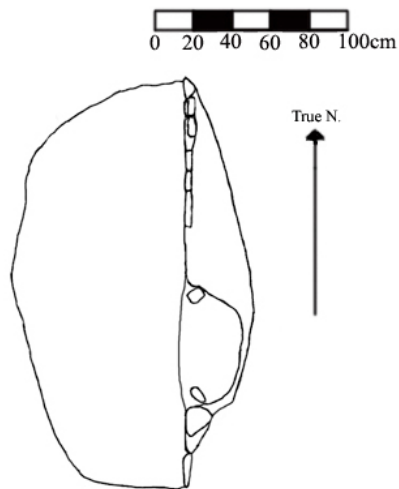
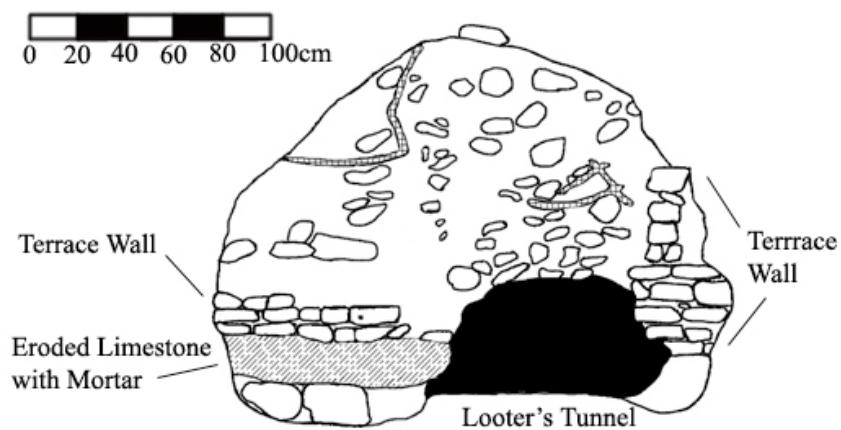


Figure 51. LT 4: East Profile.



In the center of the small trench, the looters broke through the wall and dug back into the structure for an unknown distance. In this tunnel, Cleofo Choc found fragments of a sculpted plaster frieze (Figure 52). The pieces of plaster were found lying loose in the looter's backdirt. It is not clear what the frieze represents or exactly where on the structure it was located. Perhaps the west front of the Courtyard 1A-1 platform was at one time covered in modeled plaster. If so, the remains of most of this frieze should still be present, as the looters operations on the steeply sloping west front are quite limited.

Figure 52. Plaster Fragments Recovered from LT 4.



Unfortunately, none of the artifacts recovered from this trench were chronologically diagnostic.

Looter's Trench 13

This trench (Figure 53) is located on the north side of the outer face of the platform supporting Courtyard 1A-1. The trench is 2.56 m long, 1.42 m wide, and 1.84 m deep at its deepest point, near the southern end. Two features are clearly distinguishable in the profile of this looter's trench (Figures 54 and 55). The first is a facing wall, evidenced by dressed stones set in mortar about 0.40 m from the north end (mouth) of the trench. Altogether, three courses of stones rise about 0.22 m above the trench floor. In the plan of the trench, it is clear that the line of stones extends out about 0.46 m from the trench's east wall. The orientation of the wall could not be determined, since very little of it is exposed in the trench. The second

Figure 53. LT 13: Planview.

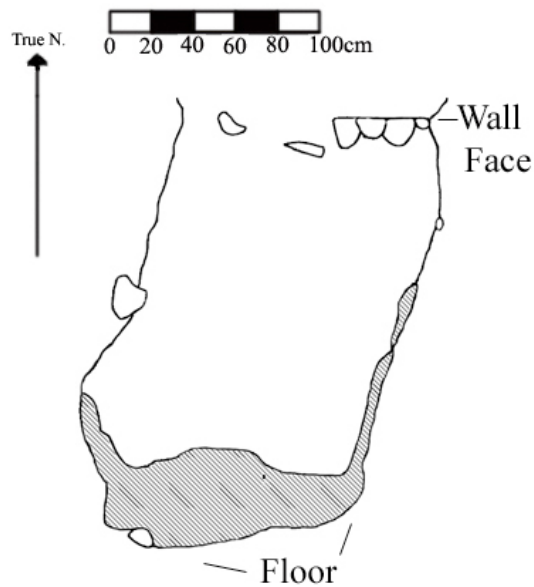


Figure 54. LT 13: East Profile.

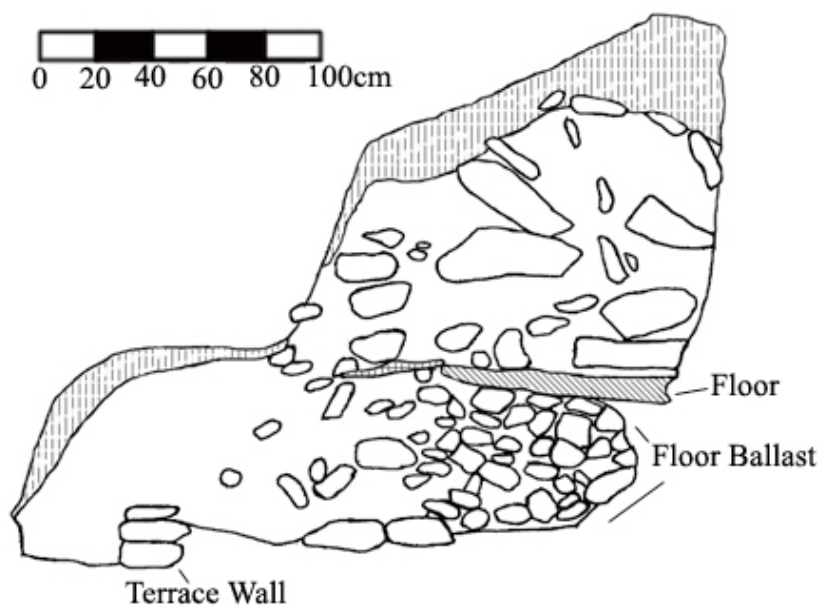


Figure 55. LT 13: East Profile Showing Plaster Floor.



important architectural feature in the trench is a plaster floor located at the back of the trench. As Figure 54 illustrates, this floor extends about 0.80 m from the south end of the trench. In the center of the trench, the floor is visible about 0.44 m from the south end of the trench, respectively. In the west wall, the floor extends 0.64 m from the south wall of the trench. This uneven floor is about 0.06-0.08 m thick. Underneath it in the southern end of the trench is a concentration of cobbles running from the base of the floor down about 0.48-0.55 m to the floor of the trench. This ballast or leveling surface, with the floor on top of it, may well represent the surface and subsurface of a terrace. The remains of the facing wall near the north end of the trench may represent the retaining wall of the terrace. If this interpretation is correct, this is likely to be the uppermost terrace of the Courtyard 1A-1 platform. Again, no diagnostic artifacts were found.

Looter's Trench 14

This trench reveals a masonry retaining wall and a significant portion of the structural core (Figures 56 and 57). Like LT 13, the trench is located on the north slope of the Courtyard 1A-1 platform. Looter's Trench 14 is 1.14 m long, 1.34 m wide and 1.32 m deep. In addition, a tunnel penetrates 2.63 m deeper into the structural core south of the trench.

The looters contacted a masonry retaining wall at the back of this trench (Figure 58). Breaking through it, they tunneled a further 2.63 m into the core of the Courtyard 1A-1 platform. At the back of this tunnel, they contacted a possible plaster

floor about 0.10 m thick. About 0.22 m above this floor remnant, there is a line of what appear to be capstones. The looters excavated along this line 2.09 m approximately southeast (122°) and 1.79 m approximately northwest (302°) of the centerline of their tunnel (Figure 59). The feature they followed is evidently a line of capstones a scant 0.20 m above a plaster floor. Its orientation (302° east of Magnetic North) is different from the orientations observed elsewhere on walls, capstones, and other architectural features of the acropolis. At present, the significance and possible function of this feature are unknown. Difficult working conditions at the back of the looter's tunnel may have led to misinterpretations or mismeasurements of the feature (one has to crawl through a tunnel less than 0.50 m high).

Figure 56. LT 14: Planview.

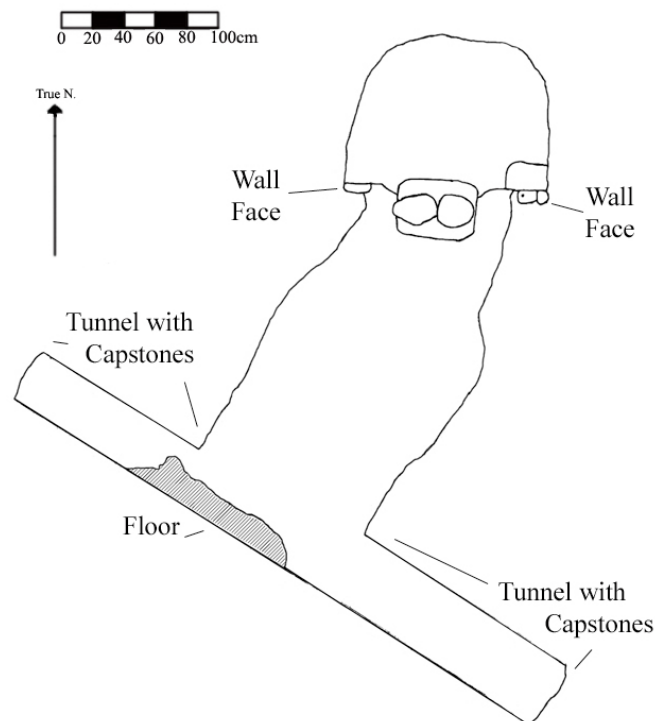


Figure 57: LT 14: East Profile

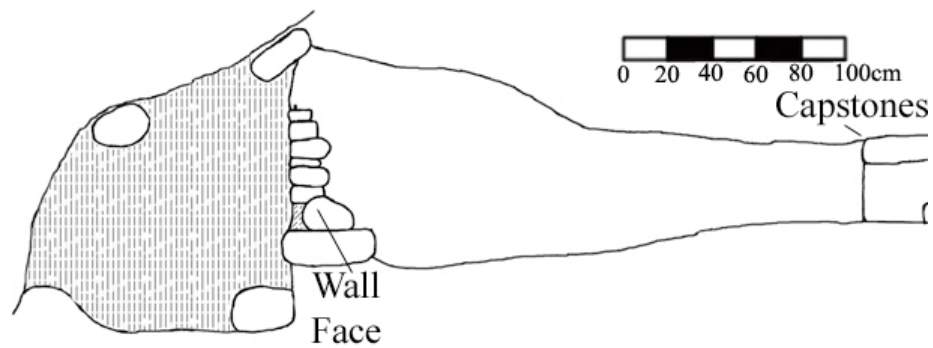
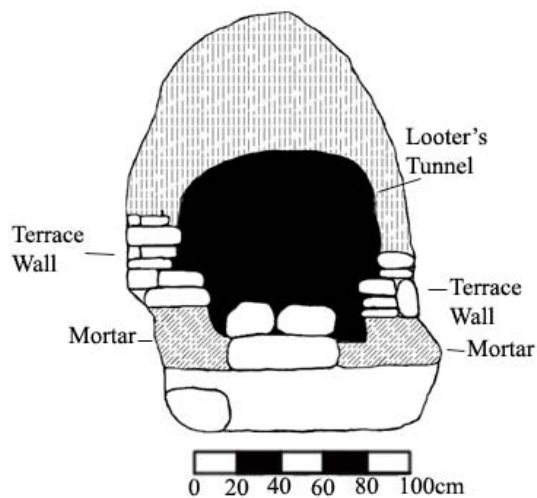


Figure 58. LT 14: South Profile Showing Masonry Wall



The retaining wall visible in the profiles of LT 14 appears to be the facing of a structural terrace on the platform that raises Courtyard 1A-1. The remains of this wall are about 0.70 m from top to bottom at the best preserved section. The wall seems to rest on a foundation of limestone mortar. This may be the badly damaged

floor and floor ballast of the surface of the next lower terrace. One rimsherd was removed from just below the junction of the wall and the limestone mortar. Dr. Jaime

Figure 59. LT 14: Exposure of a Row of Capstones at the back of the Tunnel.



Awe and Carolyn Audet tentatively suggested that this sherd might be from a Dolphin Head Red type bowl (personal communication 2003). Gifford et al. (1976:226) place Dolphin Head Red ceramics into the Early Facet of the Spanish Lookout Phase (c. A.D. 700-800).

Looter's Trench 12

LT 12 (Figure 60) is at a lower elevation than any of the previously described trenches. It is located in Structure 1A-2b, on the east side of Courtyard 1A-2. It appears that the looters were attempting to trench the building along its primary axis.

The trench is 3.20 m long, 0.88 m wide, and 2.10 m deep at its deepest point. The south profile of this trench (Figure 61) reveals two floors and the wall of the structure.

The masonry face of Structure 1A-2b's outer wall is clearly visible as a vertical line of dressed stones, cemented into a mortar-and-boulder wall core. The base of this wall, in the deepest part of the trench, is placed on top of or is abutted by (it is impossible to tell which, as the contact is not exposed in the trench) a 0.04-0.08 m thick plaster floor. Given that this floor runs under the probable wall core as well, it is likely that the structure was built on an extant plaster floor, possibly a surface of Courtyard 1A-2.

Figure 60. LT 12: Planview.

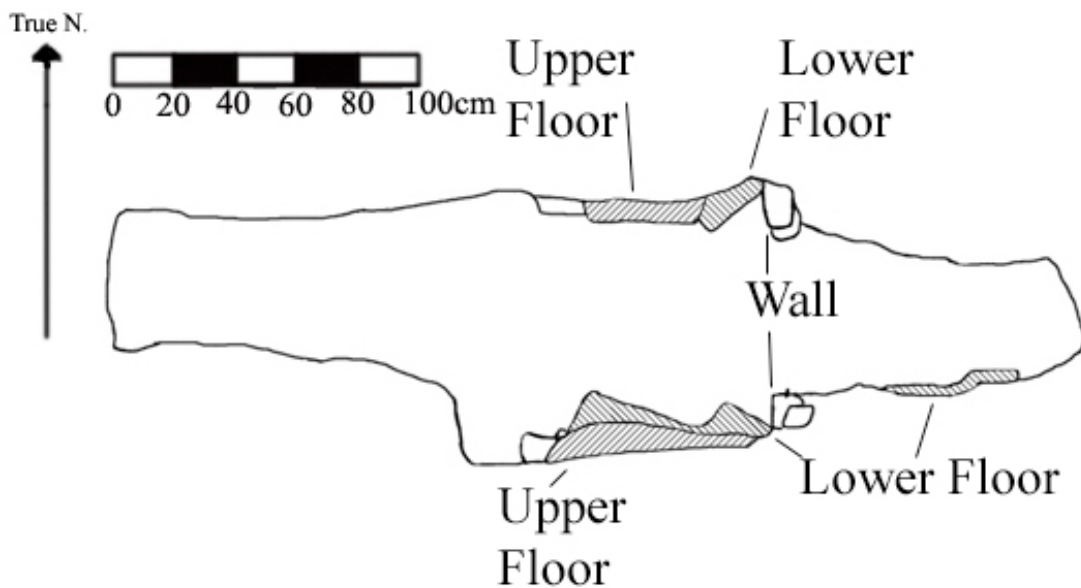
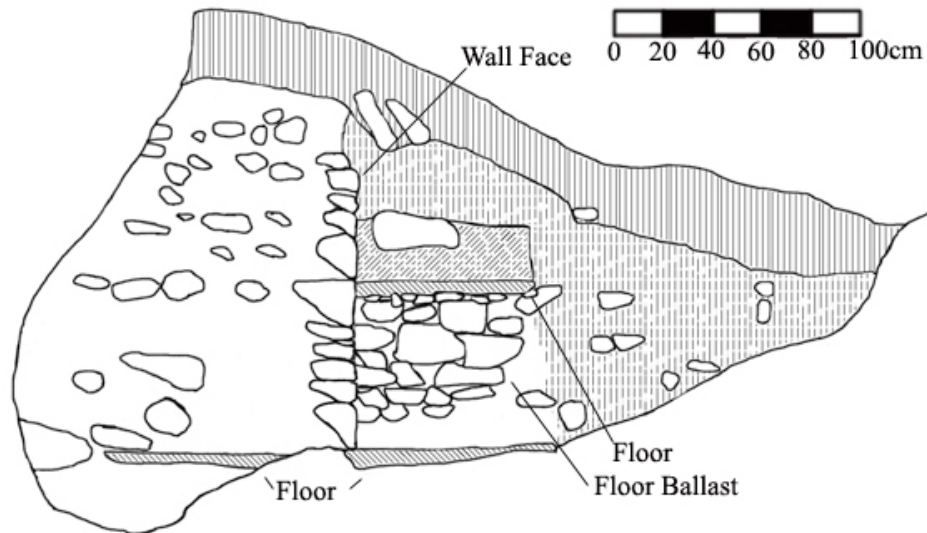
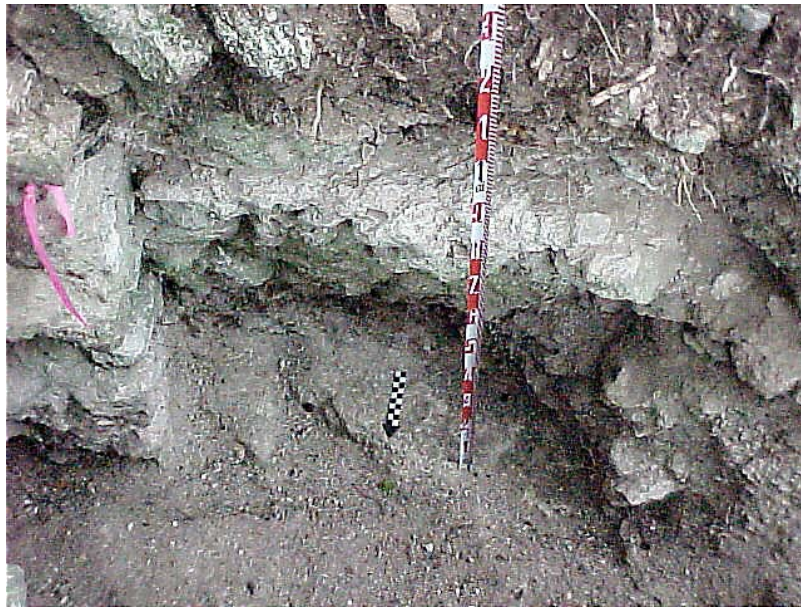


Figure 61. LT 12: South Profile.



Above this floor on the outside of the structure (west of the wall in the profile, i.e., toward the shallow end of the trench), there is a 0.10-0.12 m accumulation indistinguishable from the later collapse debris. Sitting on this is an accumulation of cobbles and boulders, which appears to form a solid base for another plaster floor, located about 0.62 m above the lower floor. The most recent floor is about 0.06-0.08 m thick and extends about 0.72 m out from the masonry wall (Figure 62). It is possible that this is a general raising of the floor of Courtyard 1A-2, or a platform that was built around Structure 1A-2b. Unfortunately, the cobble-and-boulder ballast or leveling surface and the upper plaster floor are not visible more than about 0.72 m west of the masonry wall, so we cannot assess which possibility is more likely. Beyond that point, the trench's south wall reveals only undifferentiated collapse debris.

Figure 62. LT 12: Superimposed Floors.

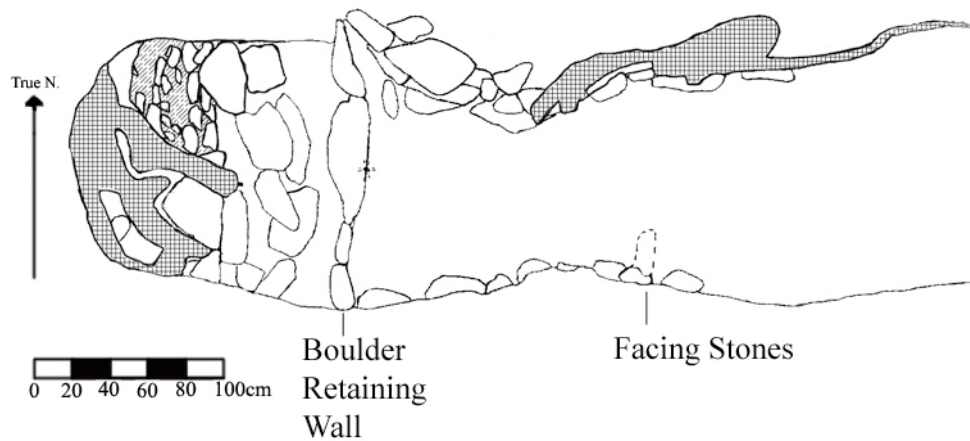


No diagnostic artifacts were recovered from the cultural layers of this trench. One white chert projectile point was recovered from the collapse debris.

Looter's Trench 17

LT 17 (Figure 63) is located at the base of the acropolis on its eastern side. It appears that the looters placed this trench while looking for the centerline of Structure 1A's primary staircase from Plaza 1. As will be described below, there is no evidence that they found the staircase. The trench is 5.11 m long, 1.52 m wide, and 1.88 m deep, with the sloping fairly steeply upward, especially toward the back (west) wall of the trench.

Figure 63. LT 17: Planview.



LT 17 exposes a number of large boulders with diameter in excess of 0.30 m. The largest boulder measures about 0.40 x 0.21 m. There is a boulder retaining wall about 3.50 m from the mouth (east end) of the trench. This wall is composed of several very large, unworked boulders bound in mortar. The retaining wall rises about 0.66 m from the base of the trench. Above the retaining wall, in the higher rear part of the trench, there is a sloping jumble of loose boulders. Above these is a layer of pebbles and cobbles bound together with mortar (Figure 64). In this layer were found numerous sherds that appeared to be from two vessels. One of these vessels was identified by Dr. Jaime Awe and Carolyn Audet as a Dolphin Head Red dish (personal communication 2003). As mentioned above, Gifford et al. (1976:226) identify Dolphin Head Red as a member type of the Early Facet of the Spanish

Lookout Phase (c. A.D. 700-800). The other vessel may have been a Roaring Creek Red dish, but the identification is very tentative due to poor preservation. Roaring Creek Red belongs to the Late Facet of the Spanish Lookout Phase (c. A.D. 800-900 [Gifford et al. 1976:226]). Another layer of mortar-bound cobbles is visible in the south profile of LT 17 (Figure 64) above the level of the retaining wall. We also recovered a speleothem in the backdirt; it was likely used as part of an offering.

Two facing stones were found in the trench. One is *in situ*; the other was broken, with the butt of the stone still in its original location. These two stones were located near the top of the trench about 2.03 m west from the mouth of the trench, about 1.30 m east of the top of the boulder retaining wall, at the same elevation as the uppermost boulder. This may have been part of the original face of the lowest terrace on this part of the acropolis (Figure 65).

Figure 64. LT 17: South Profile.

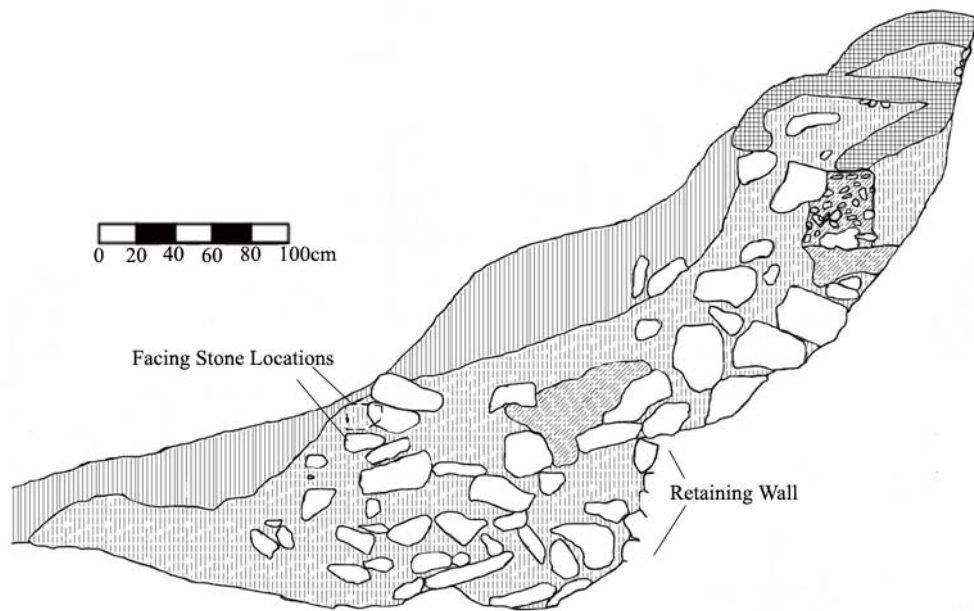


Figure 65. LT 17: Cleofo Choc Holds a Broken Facing Stone in Its Original Position.



It is easy to see why the looters dug in this location. They were clearly looking for the centerline of the main eastern stairway leading up to Structures 1A-1a-I and -II. It is not clear why there is no staircase at this location. Perhaps the ancient Maya built dual staircases, and LT 17 happens to fall between them. It seems unlikely that there was no staircase on this façade, since the structures above (Structure 1A-1a-1 and Structure 1A-1a-II) are clearly intended to overlook Plaza 1, and were probably intended for public viewing (the bench in LT 2 tends to support this idea).

CHAPTER 8

YALBAC ACROPOLIS CONSTRUCTION HISTORY

Ideally, a reconstruction of the construction history of the Yalbac Acropolis would involve a discussion of its original form, which may have been built at any time during the site's major occupation, followed by descriptions of all subsequent additions until the final form was completed. However, a complete construction history would require extensive excavations. VOPA's 2003 acropolis investigations relied entirely on existing looter's trenches to learn about acropolis architecture. Most of the looter's trenches into Yalbac's Acropolis only provide evidence for the final phase of construction of the monumental structure. Evidence of sequential reconstructions is only clearly visible in LT 1 and LT 12. There is no evidence for the initial phases of acropolis construction, and the time-depth of the complex is currently unknown.

The original form of the Acropolis is currently unreconstructible. It appears that the four lower courtyards, Courtyards 1A-2, 1A-3, 1A-4, and 1A-5 approximate the summit of the acropolis at some point, probably during the Classic Period, perhaps in the Late Classic. It is likely, though, that even these lower courtyards saw at least some rebuilding activity later. At some point, most likely during or after the Spanish Lookout Phase (ca. A.D. 700-900), significant reconstruction projects were undertaken. The most costly, in terms of labor invested, of these projects was the construction of a tall platform raising the new Courtyard 1A-1 above the height of the

previously existing courtyards. A change was also made to the surface level of at least one of the courtyards (Courtyard 1A-2 was raised by about 68 cm), but there is no way to date this event. At some point during or after the Early Facet of the Spanish Lookout Phase (ca. A.D. 700-800), and possibly even during or after its Late Facet (ca. A.D. 800-900), a new façade was probably added to the east side of the acropolis, overlooking Plaza 1. This is suggested based on the ceramics recovered from LT 17. The reconstruction of this façade may well have occurred at the same time as the building of the Courtyard 1A-1 platform, but it is impossible to determine for certain if this is the case. Overall, the relative dating of the various episodes of acropolis expansion seen in the looter's trenches is difficult because of the few chronologically diagnostic artifacts recovered.

In LT 12, two floors, one superimposed on top of the other, are evident in the profile. This suggests that Courtyard 1A-2 in front of the Structure 1A-2b, with which this trench is associated, was rebuilt at least once. In between the floors is a thick concentration of limestone cobbles bound in mortar, probably the remains of a thick layer of floor ballast. If this is the case, then the Courtyard surface was raised by a total of approximately 68 cm. Unfortunately, no chronologically diagnostic artifacts were found in LT 12, so we cannot know the timing of this reconstruction.

In LT 1, Room 3, the looters contacted a wall associated with a buried structure. I hypothesize this wall to be the top of the upper zone (façade from the level of the vault spring to the capstones; Loten and Pendergast 1984:15) of an earlier acropolis summit building. If this is the case, then it is likely that the building was at

approximately the same elevation as the Courtyard 1A-2 summit structures. When the ancient residents of the acropolis had the Courtyard 1A-1 platform built, this older summit structure, and quite possibly others, were buried whole to form part of the core of the platform.

The Courtyard 1A-1 platform itself was probably built up in a single operation. If so, it likely represents one of the largest one-time investments of labor in the Yalbac acropolis. The single diagnostic artifact recovered from this platform is a rimsherd recovered from just below a terrace wall in LT 14. This sherd has been tentatively identified as of Dolphin Head Red ceramic type. This type belongs to the Early Facet (ca. A.D. 700-800) of the Spanish Lookout Phase (Gifford et al. 1976:226). It seems likely, then, that the construction of the Courtyard 1A-1 platform dates no earlier than this time period. Despite the tentative identification of the sherd, this interpretation is likely because the Late to Terminal Classic Period (within which the Spanish Lookout Phase falls) is frequently associated with the major construction, resulting in the final or near-final configurations of many sites throughout the Central and Southern Maya Lowlands, what some have referred to as a “cultural climax” (Culbert 1973:16).

The topmost terrace of the Courtyard 1A-1 platform was the foundation for Courtyard 1A-1 and its surrounding structures. These are the highest summit structures on the acropolis. Structures 1A-1a-I and 1A-1a-II are the only Courtyard 1A-1 structures to be penetrated by looter’s trenches. The other structures, 1A-1b, -1c, and -1d are only visible as low mounds around the central courtyard depression.

One room in Structure 1A-1a-I is visible in LT 2. This room has a bench against its back wall which overlooks Plaza 1, below. It is possible that this room was filled in by the Maya with a mixture of cobbles and mortar, much as the room in LT1 was. If the rooms of Structure 1A-1a-I were filled in, it is impossible to say why. There does not appear to be an additional construction phase above this one, and there is no evidence of a roof comb or any other addition that might require the filling in of the rooms in order to bear and additional weight. At the moment, no conclusions can be reached regarding this phenomenon.

Structure 1A-1a-II is penetrated by LT 1. Three rooms were exposed to varying degrees. It appears that in its original configuration, this structure overlooked Plaza 1, with one room (LT 1, Room 4) opening on to the Courtyard 1A-1 platform above the plaza, perhaps at the top of a staircase. This room is best described as a transverse room (Loten and Pendergast 1984:3) running perpendicular to the main axis of the building. Another transverse room, behind and parallel to this one, is seen in LT 1, Room 2. The axial room (running parallel to the main axis of the building) facing Courtyard 1A-1, which is seen in LT 1, Room 1, could clearly be entered from Room 2. At first, then, this building seems to have a simple plan, with two parallel transverse rooms running the length of the structure. The small axial room behind, though, belies this apparent simplicity. The exact plan of this important summit structure cannot be conclusively determined from the architecture visible in the looter's trench. It is clear that the rearward of the two transverse rooms (Room 2) was intentionally filled in by the Maya, with the doorway between it and the parallel

Room 4 being with a roughly faced retaining wall. This action may have been taken in order to prepare the structure to support the weight of a roof comb, which may be evident above the passageway that connects LT 1, Room 1 to LT 1, Room 2. It is not clear whether or not the plaza-facing Room 4 was subsequently filled in. The very small portion of this room visible in the looter's trench has clearly been filled, but there is no way to tell whether this indicates that the whole room was filled. It is equally possible that this fill is the inside of a bench placed up against the rear wall of the room, much like the bench visible in LT 2.

Obviously, there are wide gaps in our knowledge of the construction history of the acropolis. The looter's trenches are useful in helping us to understand the construction of the Courtyard 1A-1 platform and its summit structures 1A-1a-I and -II, and the raising of the floor of Courtyard 1A-2. A small amount of information can be gleaned regarding the front wall of Structure 1A-2b, as seen in LT 12, and the lower façade of the acropolis fronting Plaza 1, as seen in LT 17.

CHAPTER 9

QUANTIFYING THE YALBAC ACROPOLIS

Applying Abrams' Formulae to Yalbac

The main drawback to using Abrams' figures and formulae (Table 1, Chapter 3) for quantifying energetic investment to the Yalbac acropolis resides in the types of materials involved. At Copán, architectural monuments are built of tuff, an igneous stone common in the Copán valley (Abrams 1994:18). At Yalbac, Structure 1A was built of limestone, which may have different performance characteristics than the Copán tuff. Experiments would be required to determine whether the difference in construction materials would have an appreciable effect on calculated values of labor investment.

Other problems which could only be surmounted by further investigation and experimentation at Yalbac involve the costs of transporting raw materials. At Copán, Abrams (1994:18) found that tuff quarries were located fairly close to the monumental center on the flanks of the valley. At Yalbac, we have no direct evidence of the locations of quarry sites. However, earth is available nearby, possibly most abundantly in the area of Yalbac Creek. Limestone is available throughout the Central Maya Lowlands, including the Yalbac area. There are outcrops near the site (Lucero: personal communication). Since procurement and transport costs are usually the most significant portions of the total labor involved in a construction project, a metric estimate must be made as to the distance from quarry to construction

site. For the purposes of this thesis, Abrams' formulae for procurement and transportation will be used. This means that the Yalbac limestone will be treated as though it were possible to quarry and dress it at the same rate as Copán's tuff. Since limestone outcrops are known in the immediate environs of Yalbac, and earth occurs throughout the site area, a transport distance of 100 m will be used to generate energetic estimates. This figure could potentially be refined by further survey to locate quarry sites.

Quantification of the Yalbac Acropolis

Observing the plan of the Yalbac acropolis (Figure 22, Chapter 7), it is clear that the largest single mass of construction in the acropolis is the platform supporting Courtyard 1A-1. Indeed, the presence of a probable buried structure in Room 3 of LT 1 suggests that this platform was built up quickly, burying earlier summit structures whole. LTs 4, 13, and 14 will all help to understand the construction of this platform

Other important events that I may be able to quantify are the building of summit Structures 1A-1a-I and 1A-1a-II and of Courtyard 1A-2. For these, there is some evidence of construction methods visible in the looter's trenches (LTs 1, 2, and 3 for Structures 1A-1a-I and 1A-1a-II; LT 12 for Courtyard 1A-2). In all cases, though, my proposed reconstructions of the buildings will, of necessity, be highly hypothetical, which may make the labor investment estimates questionable.

Construction and Volumetric Data on the Courtyard 1A-1 Platform

The Courtyard 1A-1 platform is probably the product of a single construction episode. This platform may be the largest single expansion of the Yalbac acropolis. It was certainly a major undertaking. The Courtyard 1A-1 platform is the substructure for the highest summit buildings on the acropolis, which are probably the most important buildings of Yalbac's palace. Its base is at the elevation of Courtyards 1A-2 and 1A-5. During the construction of the Courtyard 1A-1 platform, the Maya builders buried older summit buildings, such as that seen in LT 1, Room 3, whole. The platform rises 4.23 m from the level of Courtyard 1A-2.

Like most Maya buildings, this platform was built as a series of superimposed terraces. We can only measure the dimensions for one of these terraces. The floor in LT 13 is likely to be the top of a terrace at the level of Courtyard 1A-1. Probably, we see the base of this same terrace in LT 14. The hypothesized vertical face of this terrace would have measured 1.01 m. If the terraces had all been about this height, there would have been 4.18 terraces from the base of the platform at the level of Courtyard 1A-2 to its summit at Courtyard 1A-1. It is most likely, therefore, that the 4.23 m high platform was built up as 4 terraces. Since one terrace measured 1.01 m high, the other 3 must have averaged about 1.07 m high. Since the total run of the slope of the Courtyard 1A-1 platform mound is about 4 m, each of the three lower terraces would each have had a horizontal surface extending an average of about 1.30 m out from the facing wall of the next higher terrace (the horizontal surface of the highest terrace is Courtyard 1A-1). If the surface in LT 13 is any indication, these

horizontal surfaces would have been paved with plaster floors about 8 cm thick. The dimensions of each hypothesized terrace are given in Table 5, along with the calculated areas of masonry wall facing and of plaster floor surface for each terrace.

Table 5. The Four Hypothesized Terraces of the Courtyard 1A-1 Platform.

Terrace 1 (lowest):	Terrace 2:
Length (N-S): 20.66 m	Length (N-S): 18.06 m
Width (E-W): 17.66 m	Width (E-W): 15.06 m
Height: 1.07 m	Height: 1.07 m
Volume: 390.40 m ³	Volume: 291.02 m ³
Faced masonry area: 66.20 m ²	Faced masonry area: 72.33 m ²
Plastered floor area: 94.64 m ²	Plastered floor area: 81.12 m ²
Terrace 3:	Terrace 4 (highest):
Length (N-S): 15.46 m	Length (N-S): 12.86 m
Width (E-W): 12.46 m	Width (E-W): 9.86 m
Height: 1.07 m	Height: 1.01 m
Volume: 206.12 m ³	Volume: 128.07 m ³
Faced masonry area: 61.20 m ²	Faced masonry area: 47.27 m ²
Plastered floor area: 67.60 m ²	Plastered floor area: 134.64 m ² ^a
Total core volume: 1,015.61 m³	
Total masonry area: 247 m²	
Total plaster floor area: 378 m²	

^a This is the approximate area of the paved surface of Courtyard 1A-1, before the construction of any summit buildings.

The lowest terrace would, hypothetically, have measured 1.07 m high, with a north-south length of approximately 21 m and an east-west width of approximately 18 m. The next higher terrace would have measured 1.07 m high, and since it was set

back about 1.30 m from the lowest terrace, it would have a north-south length of 18.40 m and an east-west width of 15.40 m. The third terrace would have measured 1.07 m high, with a north-south length of 15.80 m and an east-west width of 12.80 m. The highest terrace would have been 1.01 m high, with a north-south length of 13.20 m and an east-west width of 10.20m. From the lengths and widths dimensions of each terrace, I have subtracted 34 centimeters to account for the masonry façade, the labor costs of which are calculated below. The plaster floor area of each horizontal surface is included with the vertical terrace wall below it, since we define each terrace as a vertical wall supporting a horizontal surface.

Energetic Analysis of the Courtyard 1A-1 Platform

Evidence from Room 3 in LT 1 suggest that the structural core of the Courtyard 1A-1 platform was made of limestone boulders and cobbles, with little mortar to bind them and little or no earth. Loten and Pendergast (1984:8) call this a “dry-stone core” and claim that it is the most stable kind of construction, because the core is held together by gravity, and not by other means, such as mortar. Based on the total core volume for all four terraces, approximately 1,015.61 m³ of boulders and cobbles would have been needed to build the core of the platform. According to Webster and Kirker (1995), based on figures from Abrams (1984a, 1994) one person can quarry 3.86 m³ of cobbles and boulders per day. Given this figure, then to extract the 1,015.61 m³ of rock used in the core of the platform would have required the investment of 263.11 person-days of labor.

Using formulae from Abrams (1994), transporting this same volume of rock would have taken about 1,083.32 person-days of labor (assuming a five-hour work day for this strenuous task, and a transport distance of 100 m). The cost of placing the core is subsumed into this transport cost. To this gross figure for structural core transport and construction, I apply a modifier for consolidation based on Abrams estimates for careful core consolidation and the placement of wall backing. This wall backing is estimated to extend for about 10 cm behind all the terrace walls, meaning that there are about 25.68 m³ of it involved in the Courtyard 1A-1 platform construction. This wall backing plus the careful consolidation of the structural core (using Abrams rough estimate of 10% of the total core volume) would add about 26.34 person-days of labor.

Therefore, without accounting for the masonry walls or the construction of floors and floor ballast, we have arrived at the gross construction estimates for the Courtyard 1A-1 platform core shown in Table 6.

Table 6. Courtyard 1A-1 Platform Core Construction Cost Estimates.

Cobble procurement: 263.11 p-d
Cobble transport (100 m): 1,083.32 p-d
Core consolidation and wall backing: 26.34 p-d
Total: 1,372.77 p-d

To this total for core construction, we must add estimates for the construction of the masonry walls and for the plastering of the walls and floors of each terrace, as

well as for plastering Courtyard 1A-1 itself, since it is the horizontal surface of the upper terrace. The total area of faced masonry walls, as estimated in Table 5 above, is 247 m². The total area of plastered horizontal surfaces (floors) is 378 m². The area of plastered vertical surfaces (wall faces) is 247 m². Webster and Kirker (1995), using data from Abrams (1994) estimate that one laborer can quarry 0.4 m³ of Copán Valley volcanic tuff in one day. Abrams (1994) gives a formula for calculating the cost of transporting tuff to the worksite, and figures for the dressing of the rock and the building of walls. These estimates (Table 1, Chapter 3) are 1 m³ of dressed masonry can be manufactured in 11.6 person-days, and 0.8 m³ of wall can be built in one person-day.

To use these figures, the area of dressed masonry on the Courtyard 1A-1 platform (247 m²) must be converted to an approximate volume of masonry. The faced stones drawn in the profiles of LTs 13 and 14 average about 17 cm deep. This is a useful figure for converting the 247 m² of faced masonry area into 41.99 m³ of faced masonry volume for all four terraces of the Courtyard 1A-1 platform. Using Webster and Kirker's (1995) figure, these 41.99 m³ of masonry would have taken 104.98 person-days of labor to quarry. To transport the 41.99 m³ of limestone blocks from a quarry site within 100 m to the worksite would have required another 47.99 person-days.

Using Abrams' (1994) figure, the same volume of stone could have been dressed by Maya stonecutters at the cost of another 487.08 person-days of labor. Keep in mind that these figures treat the limestone as though it were the volcanic tuff

found in the Copán Valley. Actual figures for the Yalbac limestone are likely to have actually been slightly different from these estimates. Once the blocks of limestone had been faced by Maya stonecutters, masons would have had to invest 52.49 person-days of labor in the actual construction of the terrace walls.

According to Abrams (1994:49), “the manufacture of plaster involved several interrelated activities: cutting, transporting, and stacking trees as well as excavating, preparing, and transporting stone.” Abrams combined Erasmus’ (1977) figures for plaster production with his own estimates of transport costs to arrive at a standard manufacturing cost for plaster. This figure is 43.9 person-days of labor for the manufacture of 1 m³ of plaster from limestone. He also estimated that one laborer could apply a 2.5 cm thick plaster surface over 80 m² in a single day. He did not conduct experiments to determine what kinds of modifiers should be applied for the construction of thicker plaster floors. For now, I will have to use this 80 m² figure as though the thicker floors evident on the Courtyard 1A-1 platform did not require additional labor to build. This is clearly not satisfactory, but it is a necessary compromise in lieu of additional experimental data. Abrams did not address differences in person-days invested in plastering vertical surfaces as opposed to horizontal surfaces. The two operations will be treated here as though they required the same amount of labor, another compromise necessitated by the lack of experimental information.

The floors of the Courtyard 1A-1 platform’s terraces (along with the courtyard itself), covered 378 m². The laying of these floors would have required an investment

of approximately 4.73 person-days of labor. If the floors averaged about 8 cm thick (as the courtyard floor evident in LT 13 appears to indicate), then they would have required the investment of 30.24 m³ of plaster in their construction. The vertical plastered wall faces had a total area of 247 m², and would have required 19.76 m³ of plaster. Plastering the wall faces would have required 3.08 person-days of labor. The manufacture of the whole 50 m³ of plaster would have taken 2,195 person-days of labor. The total labor invested in the masonry facing and plaster floors of the Courtyard 1A-1 is summarized in Table 7.

Table 7. Courtyard 1A-1 Platform Faced Masonry and Plastering Cost Estimates.

Quarrying limestone for facing stones:	104.98 p-d
Transport of limestone to construction site (100 m):	47.99 p-d
Dressing of quarried limestone:	487.08 p-d
Construction of terrace walls:	52.49 p-d
Manufacture of plaster:	2,195 p-d
Plastering of floors and walls:	7.81 p-d
Total:	2,895.35 p-d

Combining the estimated costs of construction for both the structural core and the masonry facing and plaster flooring of the Courtyard 1A-1 platform, we arrive at a figure of 4,268.12 person-days.

It is likely, based on the wall observed in LT 1, Room 3, that the Maya buried at least one earlier building when they built the Courtyard 1A-1 platform. This building, and any others that may have been buried along with it, would represent,

obviously, earlier construction operations. The volumes of the remaining standing architecture of these buried structures would have to be deducted from the total volume of the structural core of the platform. Also, the Maya practice of reusing the building materials of older structures during new construction operations (Abrams 1998) could also have cut down on the quarrying, transport, and manufacturing costs associated with the construction of the Courtyard 1A-1 platform. Since the buried structure visible in LT 1 may well be complete or nearly so, its rooms would probably have had to have been filled in to cope with the weight of the platform built over it. This may have added to the labor investment involved in platform construction. At present, the amount of labor required for these tasks and the savings represented by reuse cannot be quantified. The estimates above treat the construction of the Courtyard 1A-1 platform as a single episode, without antecedent and without accounting for the reuse (in any form) of building materials. This is necessary due to the limits of currently available information. Only a program of excavation into the platform could hope to fine tune the estimates given here.

Structures 1A-1a-I and 1A-1a-II

These structures occupy the eastern side of Courtyard 1A-1. At first, it was thought that the 1A-1a mound represented the remains of only one structure, but it was thereafter divided into southern (1A-1a-II) and northern (1A-1a-I) components based on the relative heights of the two ends of the mound (it is significantly higher toward its southern end). During the looter's trench profiling work of the 2003 field

season, I favored the hypothesis that the mound covered the remains of a single structure, with a front range of rooms represented by the room with a bench in LT 2 and Room 4 of LT 1. In later analysis of the looter's trench plans and profiles, inconsistent wall thicknesses and placements led me to believe that the various walls seen in LTs 1, 2, and 3 could not possibly have formed one building. I have returned to the two building hypothesis and will organize the information below based on it. It must be remembered, however, that this question has not been definitely resolved. Only the excavation and consolidation of the mound can do that.

There are large gaps in our knowledge of the plans, designs, and architecture of these buildings. As it stands, there is more information available on Structure 1A-1a-I than there is on Structure 1a-1a-II. This is because the most informative looter's trench is LT 1, which reveals much of the construction and the interior arrangement of the rooms of Structure 1A-1a-II. For Structure 1A-1a-I, we have a good deal of information about one room, that revealed in LT 2, which is probably near the northeastern corner of the Structure. There is no information on any other rooms. LT 3 also reveals part of what is probably the Courtyard-facing wall of this building, but it ends in the wall core and does not break through into any rooms.

To begin with, I will explain what we do know about the two buildings and what it means in terms of energetic investment. I will lay out what data we have about wall construction, including height, width, and plastering, floor construction, additions such as the bench in LT 2, and whatever can be determined about the vaults of the buildings.

In LT1, the looters revealed two transverse rooms in Structure 1A-1a-II. The rooms are arranged parallel to one another, with Room 4 overlooking Plaza 1 and Room 2 at the back of the building. Attached Room 1 may well have opened onto Courtyard 1A-1. The dimensions of various walls and other architectural elements in LT 1 are given in Table 8. Architectural elements not appearing in Table 8 were not visible in the looter's trench.

As can be seen from Table 8, there is much information regarding the architecture and construction of Structure 1A-1a-II that is missing. Before undertaking meaningful volumetric, and by extension, energetic, analyses of this structure, excavations would have to be undertaken. The structure does appear to be large, but not nearly as large as largest monumental structure analyzed by Abrams at Copán (Structure 10L-22). That acropolis summit building appears to measure about 45 m by 20 m, with walls anywhere from 4 m to 9 m thick, based on measurements taken from Abrams' Figure 11 (Abrams 1994:56). The hypothetical reconstruction of Yalbac Structure 1A-1a-II suggests dimensions of anywhere from 8 m x 7 m to 8 m x 10 m. It was almost certainly not more than one-tenth the size (in terms of area) of Structure 10L-22 at Copán. Abrams gives an energetic investment figure of 24,705 person-days for the construction of 10L-22. A figure one-tenth or less that size seems reasonable for Structure 1A-1a-II. That would mean a maximum of 2,470.5 person-days.

Table 8. LT 1 (Str. 1A-1a-II) Architectural Feature Dimensions.

Spine wall (between Rooms 2 and 4): Width: 1.28 m Height: 1.77 m ^a	Room 2 vault: Perpendicular height: 1.15 m Vault soffit (spring to capstones): 1.38 m Vault soffit angle: 32° from vertical Width of capstones: 26 cm
Rear wall (between Rooms 1 and 2): Width: 1.40 m ^b Height: 1.10 m ^a	Room 1 vault: Perpendicular height ^c : 62 cm Vault soffit (spring to terminus ^c): 65 cm Vault soffit angle: 46° from vertical
Room 1 walls: Height: 63 cm ^a	
Room 4 plaster floor: Thickness (surface to base): 6 cm	

^a This is not the total height of the wall. It measures from the vault spring down to the modern ground surface (the top of the looter's backdirt).

^b This dimension is estimated, it was not accurately recorded. The actual width may be less than that given here.

^c This vault is not complete. Roughly the lower half of the south side of this vault is preserved. The capstones are not preserved.

Structure 1A-1a-I is even harder to quantify than 1A-1a-II. The most informative looter's trench for the architecture of this structure is LT 2. LT 3 also exposes part of the rear, courtyard-facing, wall of the structure. Dimensions that can be gleaned from these trenches are given in Table 9.

As is indicated in Table 9, even less information is available in regard to Structure 1A-1a-I. The hypothetical reconstruction of this structure suggests dimensions of about 8.5 m x 6.5 m. This would make the structure no more than approximately one-seventeenth the size of Copán Structure 10L-22. That would mean it could have been built at a cost of about 1,453.25 person-days of labor.

Table 9. LTs 2 and 3 (Str. 1A-1a-I) Architectural Feature Dimensions.

LT 2 room front wall (facing Plaza 1):	LT 2 room plaster floor:
Width: 86 cm	Thickness (surface to base): 4-5 cm
Height: 44 cm ^a	Spine wall (as seen in LT 2):
LT 2 room bench:	Width: > 1.18 m ^c
Height above floor: 63 cm	Rear wall (as seen in LT 3):
Depth (front to rear/wall): 1.42 m	Width: > 1.46 m ^c
LT 2 room vault:	
Perpendicular height: 30 cm ^b	
Vault soffit (spring to terminus): 34 cm ^b	

^a This wall is not preserved to its original height. This dimension is the distance from modern ground surface (top of the looter's backdirt) to the top of the remains of the doorjamb in the south profile of LT 2.

^b This vault is far from complete. Perhaps a quarter or less of the west side of the vault is preserved.

^c The total width cannot be determined. This is the distance from the facing stones to the point at which the looter's excavations terminated. The total wall width must be greater than this.

The figures given above, comparing the labor investment represented by these two Yalbac acropolis summit structures to an important summit structure at Copán, are gross approximations only. Only excavations into the Yalbac structures would refine the figures to any meaningful degree. Many other factors, such as relative quality of construction, would also have to be taken into account.

Structure 1A-2b and Courtyard 1A-2

Construction data on acropolis Structure 1A-2b is scanty. Fortunately, though, the looter's trench dug along the main axis of this building does provide an excellent opportunity to discuss the labor investment made by the ancient Maya in an important acropolis courtyard, Courtyard 1A-2.

In the profile of the looter's trench, LT 12, two superimposed floors are clearly visible. The front wall of Structure 1A-2b was clearly built on top of the lower of these two floors. At some point, the Maya laid down 10 cm of earth above this floor, followed by about 50 cm of cobbles bound in mortar to serve as the ballast for the higher floor. This newer floor is made of plaster about 8 cm thick. I believe that this newer floor and the ballast beneath it represent a general raising of the plaster floor of Courtyard 1A-2. I believe this is so because the modern ground surface of the courtyard is close to, even a little bit higher than, the elevation of the newer floor in LT 12.

If the entire surface of Courtyard 1A-2 was raised by the addition of a 10 cm layer of earth, 50 cm of mortar and cobbles for ballast, and a new 8cm thick plaster floor, then I should be able to calculate the volume and area of each operation and suggest an overall energetic cost for raising the courtyard. The overall dimensions of Courtyard 1A-2 are approximately 19 m east-west by 21.4 m north-south. The areas and volumes for each of the operations in the courtyard-raising project are given in Table 10.

Table 10. Construction Costs for the Courtyard 1A-2 Raising Project.

Covering old courtyard surface with 10 cm of earth:

Volume of earth: 40.66 m³

Procurement of earth: 15.64 p-d

Transport cost of earth (100 m): 108.43 p-d

Building 50 cm thick cobble and mortar floor ballast:

Volume of cobbles: 203.3 m³

Procurement of cobbles: 52.67 p-d

Transport cost of cobbles (100 m): 216.85 p-d

Construction of floor ballast (binding cobbles in mortar): 42.35 p-d^a

Laying 8 cm thick plaster floor:

Volume of plaster: 35.53 m³

Manufacture of plaster: 1,559.77 p-d

Construction of floor: 5.08 p-d

Total cost: 2,000.79 p-d

^a Abrams' (1994) figure for the energetic cost cobble subflooring is in person-days per unit area. The thick ballast of Courtyard 1A-2 suggests that person-days per unit volume would be more appropriate. I have here used his estimate for the cost of fine substructural and/or superstructural wall fill (i.e. 4.8 m³/p-d) as a compromise. Only additional experimentation could refine this figure and give a better estimate for the construction costs of thick floor ballasts.

It is interesting to note that in the case of the construction of this courtyard floor, it is possible that the transport costs are projected to have been exceeded as the single most expensive factor by the manufacture of plaster. In all of the construction cost estimates given for projects at Yalbac, this is the only case in which some other operation is estimated to have required greater investment than the transportation of materials. In the estimates for the construction of the Courtyard 1A-1 platform given above, the manufacture of plaster for the terrace floors did come close to matching the total transport costs, but did not quite equal them. Of course, Abrams' estimates

for the manufacture of plaster include certain transport operations—the transport of fuel wood and of limestone—which cannot be quantified independently (Abrams 1994:49).

It is also interesting to note that acropolis courtyard-raising projects at Yalbac, like the one hypothesized above, might possibly have been as expensive as, or even more expensive than, the construction of acropolis summit structures, in terms of the amount of labor invested. When the above estimates are compared to the rather gross approximations made for the construction costs of Structures 1A-1a-I and II, it can be seen that the estimates for the cost of raising Courtyard 1A-2 are higher than those of the cost of Structure 1A-1a-I. When they are compared to the estimates made for Structure 1A-1a-II, the estimated costs of raising Courtyard 1A-2 are slightly lower. It is difficult, because of the poor information available on Structures 1A-1a-I and II, to say whether the estimates for their construction are reasonable approximations of the actual costs or not. If they are, though, two factors might account for the greater amount of labor invested in the Courtyard 1A-2 raising compared to the construction of the buildings. First, the courtyard covers a substantial area and its surface appears to have been raised a total of about 68 cm. This makes for a large volume of construction. Second, the paving of the courtyard required a large amount of plaster. Abrams' experiments show that the manufacture of plaster in the ancient Maya manner was a time-consuming and labor-intensive activity.

CHAPTER 10

COMPARISONS TO COPÁN AND TIKAL

Comparisons to Copán

The ability of Yalbac acropolis residents to command labor for private construction projects is substantially different from that available to elite lineages, or houses (Gillespie 2000) at Copán or Tikal. This is evident when the energetic quantifications of Yalbac Acropolis construction operations are compared to what we know about acropolis and elite residence construction at those other sites.

The two summit structures evaluated at Yalbac, Structures 1A-1a-I and 1A-1a-II, are estimated to fall well within the energetic estimates for non-royal elite monumental structures in the Las Sepulturas Zone (Table 2, Chapter 4). The rough estimate made for Structure 1A-1a-II suggests a maximum of 2,470.5 person-days labor went into its construction. For Structure 1A-1a-I, the figure suggested is about 1,435.25 person-days.

Figure 66 compares the labor investment made in Las Sepulturas Zone Group 9N-8 at Copán to that made in the two Yalbac Acropolis summit structures. Group 9N-8 has been identified as one of the most important non-royal elite palaces at Copán (Chapter 4). As the chart shows, the energy invested in all of the Group 9N-8 dominant structures and several of the other residential structures probably exceeded that made in the Yalbac Acropolis summit structures. Some of the 9N-8 structures required several times as much labor to build as did the Yalbac structures. 9N-82C,

the largest Las Sepulturas structure, required almost 3.5 times as much labor as Yalbac Structure 1A-1a-II and nearly 6 times as much labor as Structure 1A-1a-I. Investment in several ritual structures in Group 9N-8 also exceeded that made in Yalbac Structure 1A-1a-I, but did not exceed the cost of Structure 1A-1a-II.

Figure 66. Comparison of Energetic Investment in Yalbac Acropolis Structures to Structures in Group 9N-8 at Copán.

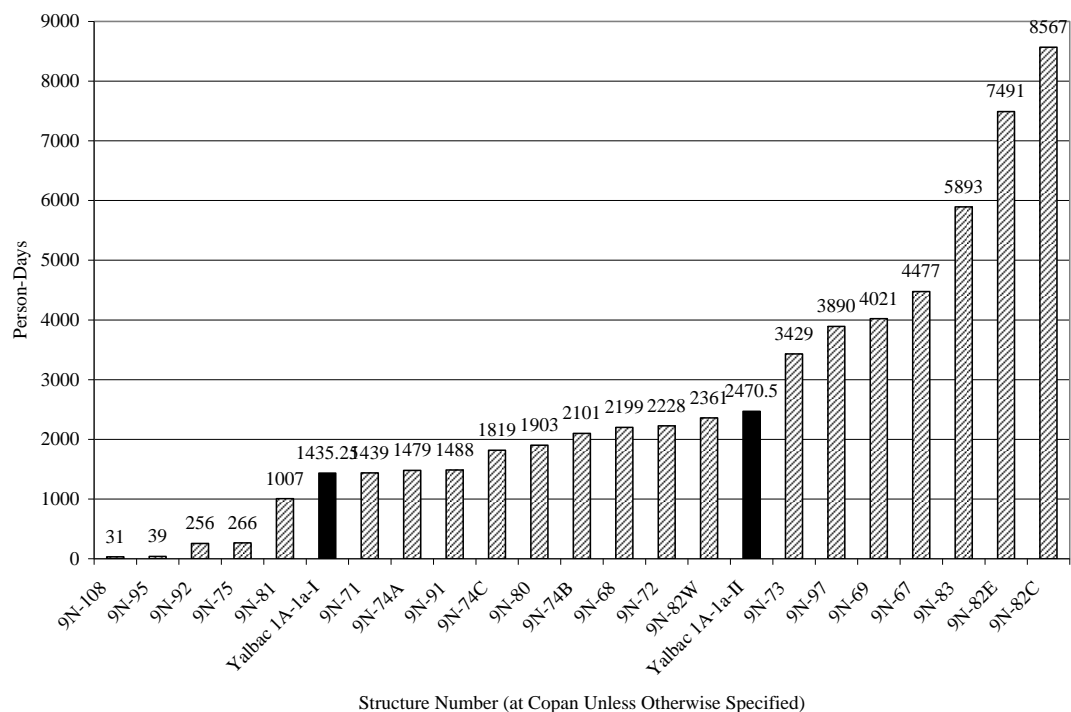
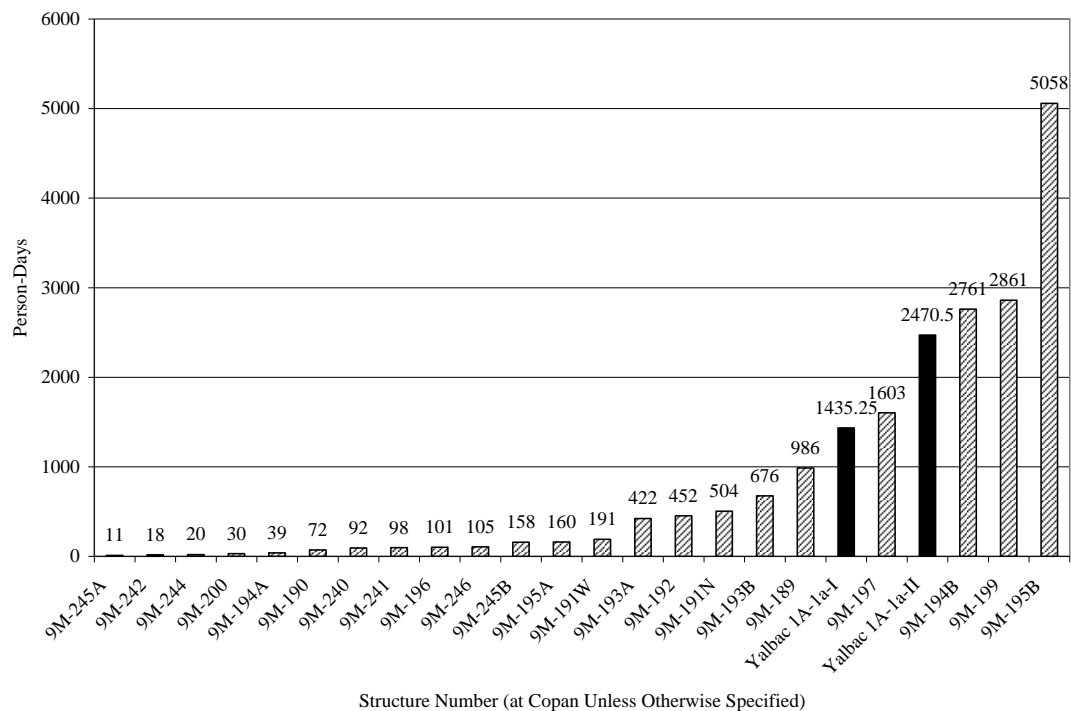


Figure 67 compares the total energetic investment in the two Yalbac Acropolis summit structures to the energetic costs of the structure in Las Sepulturas Zone group 9M-22. This group has been discussed as a small palace of a less-highly ranked elite group, compared to the group resident at Group 9N-8 (Chapter 4). One of the dominant structures in Group 9M-22, Structure 9M-195B, is more than twice

as expensive, energetically speaking, as the Yalbac structures. Several other 9M-22 structures, both residential and ritual, represent similar amounts of energetic investment as the Yalbac structures. In the lower-status Group 9M-24 no structures equaled the Yalbac structures in terms of amount of energy invested in their construction.

Figure 67. Comparison of Energetic Investment in Yalbac Acropolis Structures to Structures in Group 9M-22 at Copán.

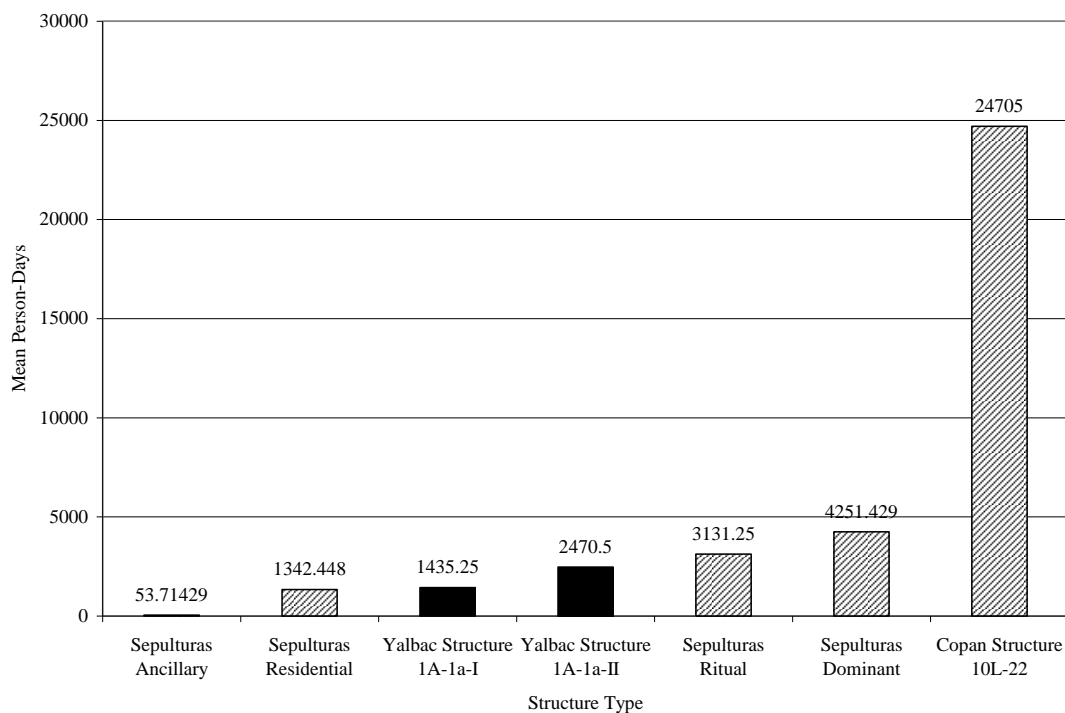


Royal residential buildings investigated at Copán have not been quantified energetically. Sharer, Traxler and their colleagues have studied structures from the Early through Late Classic periods beneath the Acropolis (Sharer, Miller, and Traxler 1992; Sharer et al. 1999; Traxler 2003). E. W. Andrews V, Fash, and their colleagues

have looked at the final Late Classic Copán palace, in what is called Group 10L-32 (Andrews and Fash 1992; Andrews et al. 2003). Estimating any kind of energetic evaluations for these buildings would require a great deal of extrapolation. It is probably safe to say, however, that the Yalbac summit structures would fall well within the range of energetic investment for royal residential buildings at Copán. There are significantly larger, and probably more expensive, buildings, such as Structure 10L-32 itself and Structure 10L-43, as well as other structures, such as 10L-232 and 10L-237 which are smaller than 1A-1a-I and 1A-1a-II, and which probably required less labor to build.

The two Yalbac Acropolis summit structures, then, are well within the range of Copán royal and non-royal elite residential structures, in terms of how costly their construction was. These two structures are probably among the most important, if not the most important, on Yalbac's acropolis. Structures of possibly equivalent importance at Copán, such as the main structure of the Late Classic palace, Structure 10L-32, appear to be a good deal larger than the Yalbac structures. Even several important non-royal structures in Groups 9N-8 and 9M-24 (especially 9N-82C, 9N-82E, and 9M-195B) of the Las Sepulturas Zone were significantly more costly to build than the most important buildings on Yalbac's acropolis. For Copán structures for which energetic analysis has been carried out, this information is summarized in Figure 68. The chart compares the cost of the Yalbac summit structures to mean investments in Las Sepulturas Zone structure types as well as to Structure 10L-22.

Figure 68. Comparison of Person-Days Invested in Yalbac Acropolis Summit Structures to Copán Structure 10L-22 and to Mean Investments in Structure Types from the Las Sepulturas Zone at Copán.



An important distinction to be made between these Copán royal and non-royal elite residences and Structures 1A-1a-I and 1A-1a-II at Yalbac is that none of the Copán buildings was raised on a massive monumental platform, like Yalbac's Courtyard 1A-1 platform. Even the Late Classic palace structures of Group 10L-32 were only raised on modest individual substructures. By this period, the massive Acropolis substructural complex at Copán appears to have had primarily ritual, mortuary, and possibly administrative functions (Fash et al. 1991; Sharer, Miller, and Traxler 1992; Sharer et al. 1999). Prior to this period, the royal residences of Copán

appear to have been located on the Acropolis or around adjacent plazas attached to its northern side (Sharer, Miller, and Traxler 1992; Sharer et al. 1999; Traxler 2003).

The Acropolis itself was built over a long period of time, from the Early Classic through the Terminal Classic. The final version visible today represents the end product of a large number of construction phases (Sharer, Miller, and Traxler 1992, Sharer et al. 1999). The earliest major construction episode appears to have occurred in the Early Classic, around A.D. 420 to 440 (Sharer et al. 1999:5). This consisted of a platform (called Yune by archaeologists) measuring approximately 70 m on each side, rising to an unspecified height. The dimensions of this earliest version of the Copán acropolis appear to be significantly larger than those of the Yalbac Courtyard 1A-1 platform. However, the purely residential parts of the early Copán Acropolis, constructed for the exclusive use of the royal dynasty, occupied a smaller platform measuring about 12 m by 16 m and 3 m high (The Chinchilla and Papo platforms, Sharer et al. 1999:9). This residential acropolis is slightly smaller than the Courtyard 1A-1 platform, and therefore likely to have required somewhat less labor investment.

Subsequent acropolis expansion projects at Copán included a single-operation 40 m expansion of the early Acropolis at around A.D. 500-600 (Sharer, Miller, and Traxler 1992:152), and, at around the same time (or slightly earlier), substantial raising of the whole acropolis, to a total height of 10 m, an increase of at least 5 m over earlier versions (Sharer et al. 1999:12-13). Finally, a massive new northward extension of the Acropolis buried the early northern palace groups, and led to the

founding of the new palace (Group 10L-32) to the south. Expansions of the Acropolis, and particularly of the summit buildings, continued into the Terminal Classic.

The energetic costs for the various expansions of the Copán Acropolis cannot be calculated based on the published data. However, it is clearly safe to say that the final version of the Copán Acropolis was significantly larger than that at Yalbac. At Copán, the currently visible version of the Acropolis measures more than 200 m by 175 m (Sharer, Miller, and Traxler 1992:146). This means it covers an area more than 14 times the size of its counterpart at Yalbac. The labor invested in the single operation of building the Courtyard 1A-1 platform at Yalbac may have fallen within the range for labor invested in single acropolis-expansion operations at Copán. Eventually, though, the Copán dynasts invested far more labor in their acropolis in total than did the ruling family at Yalbac.

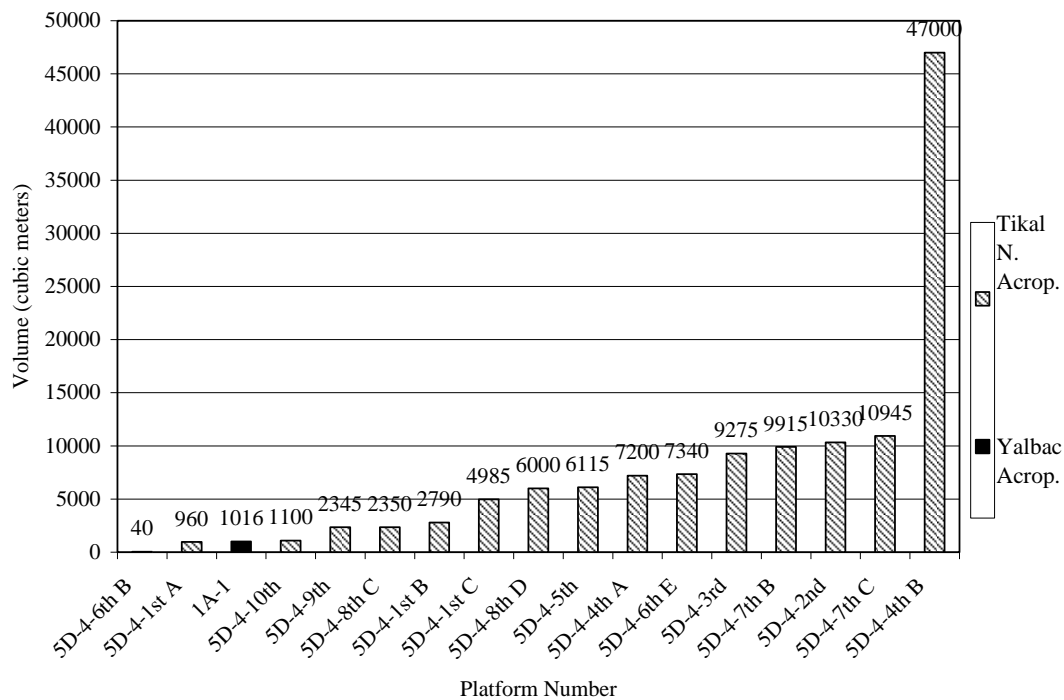
Comparisons to Tikal

Comparisons to the North Acropolis at Tikal suggest a parallel pattern. There, various expansions were analyzed by Coe (1990) during extensive trenching excavations. See Table 3 (Chapter 4) for Coe's volumetric estimates for these various construction phases.

The estimated volume of the Courtyard 1A-1 platform construction operation (1,015.61 m³ for the substructural core) falls within the range of construction phase volumes for Tikal's North Acropolis. Clearly, though, it is on the lower end of the

range, with many of the North Acropolis construction phases involving far greater volumes of construction. Figure 69 shows this comparison. Only two North Acropolis platform construction phases required the investment of less energy than the construction of Yalbac's Courtyard 1A-1 platform.

Figure 69. Comparison of the Volumes of Construction Phases of the North Acropolis at Tikal to the Courtyard 1A-1 Platform at Yalbac.



The Courtyard 1A-1 platform of the Yalbac Acropolis involved a total investment of about 4.2 person-days per cubic meter. Assuming that building at Tikal involved a 100 m transport distance, and similar ratios of substructural core to masonry facing and plaster as seen at Yalbac, then construction phases of the North

Acropolis platforms at Tikal might have involved anywhere from about 168 person-days of labor for Platform 5D-4-6th B to nearly 197,000 person-days for Platform 5D-4-4th B. The higher labor investments, which would be required for phases like 5D-4-4th B and 5D-4-7th C are many times greater than the cost of building the Courtyard 1A-1 platform at Yalbac.

For monumental palaces at Tikal, there is no volumetric or energetic quantification available. Any comparisons between structures at Yalbac and Tikal complexes like the Central Acropolis (Harrison 1970) or Group 7F-1 (Haviland 1981) must be tentative and based only on readily observable differences in the size of structures.

Tikal's Central Acropolis, the primary royal palace at the site, contains structures many times larger than the summit structures of the Yalbac Acropolis. Structure 5D-46, also called the Maler Palace, is one of the most important buildings in the acropolis complex, possibly equivalent to important Yalbac Structures 1A-1a-I and 1A-1a-II. While the Yalbac structures measure no more than about 8.5 m x 6.5 m and 8m x 10 m, respectively, the Maler Palace measures approximately 35 m by 20 m. In terms of area, then, the Tikal Structure 5D-46 is more than 12 times the size of Yalbac Structure 1A-1a-I and almost nine times the size of Structure 1A-1a-II. Other Central Acropolis buildings, such as Structure 5D-62, 5D-66, and 5D-45 are also far larger than the Yalbac Acropolis summit structures. Rough estimates based on the Central Acropolis plan (Figure 19, Chapter 4) indicate that the Yalbac Structures are

comparable in size (and probably in terms of energy invested) to some of the smallest structures on the Central Acropolis, such as Structure 5D-63 and 5D-69.

Tikal Group 7F-1 appears to be more or less equivalent to the kinds of non-royal elite palaces examined in the Las Sepulturas Zone of Copán, such as Group 9N-8 and Group 9M-22. The main building of this group, Structure 7F-30 measures about 27 m x 16 m. Other structures are generally smaller. Yalbac summit Structures 1A-1a-I and 1A-1a-II would be in the lower end of the range of size for structures in Group 7F-1. They would be most comparable to Structure 7F-31.

In sum, monumental architectural construction at Copán and Tikal appear to frequently have involved as much or more labor investment than the quantified architecture at Yalbac. This is predictable, given the vast differences in size, population, and probable political importance between Yalbac and the other two centers.

CHAPTER 11

DISCUSSION

Compared to the amount of labor invested by the dynastic families of Copán and Tikal in their monumental acropoli, that invested in the Yalbac acropolis seems to be quite small. However, the Acropolis at Copán and the North Acropolis at Tikal are primarily structures with ritual (Coe 1990; Sharer et al. 1999), mortuary (Coe 1990; Sharer et al. 1999), and (at Copán) possibly administrative functions (Fash et al. 1991). The royal residence at Tikal is located on the smaller Central Acropolis, which also fulfilled some administrative functions (Harrison 1970, 1986, 2003a, 2003b). At Copán, the palace was located on smaller platforms to the north of the Acropolis until it was moved to the Group 10L-2 complex in the Late Classic period (Sharer, Miller, and Traxler 1992; Sharer et al. 1999; Traxler 2003; E. W. Andrews and Fash 1992).

It is impossible to say what this distinction in function between the Yalbac Acropolis and the Copán Acropolis and North Acropolis of Tikal means in terms of labor procurement. At first, it would seem that the functions of the Yalbac Acropolis were likely to have been more private and secular. Generally, though, there is a great deal of overlap between the so-called “public” and private” domains, both in ritual/mortuary buildings and in palaces. McAnany (1998) discusses the identification of ancestral mortuary shrines with the residences of Maya lineages. Mortuary temples, usually considered ritual or religious structures, may thus have

been considered by the Maya to be part of their home, and therefore more private than public in nature. At Copán, acropolis buildings were frequently maintained as mortuary shrines following the death of the rulers with which they were associated (Sharer et al. 1999:20), and may have been conceived of as part of the royal palace by the Copán dynasty. They would have been the “houses” of dynastic ancestors, much as the then-current palace residence would have been the house of the living ruler. Conversely, supposedly residential palace structures have frequently been shown to have also had public functions. Harrison (1970, 1986, 2003a) discusses the various administrative, production, storage, and temporary housing functions that he postulates for the various buildings of the Central Acropolis at Tikal. At Dos Pilas, Demarest and his colleagues believe that the primary royal residence also served as a centerpiece for public display during important ritual processions (Demarest et al. 2003).

Bearing in mind this difficulty of distinguishing public from private, it is difficult to say what the ability of Yalbac’s ruling house to acquire labor for palace construction really means in terms of determining the kind of power those individuals held over their subjects. Price’s (1978) argument that the ability of the elite to extract labor to build monumental residences is a more significant measure of the amount of energy under their control than their ability to extract labor for other kinds of structures is undermined, at least in the Maya area, by this inability to distinguish public from private monumental construction.

Comparing the construction of the Yalbac Acropolis to others at Copán and

Tikal, we see a great number of commonalities. At first, the relatively small size of the Acropolis at Yalbac compared to those at Tikal and Copán might seem to indicate that the Yalbac rulers were less able to extract labor from their subjects. It must be born in mind, though, that the political situation at Yalbac is likely to have been quite different than that at either Copán or Tikal. Tikal was a major polity capital with a very large population, perhaps as high as 62,000 (Culbert et al. 1990). Copán was also an independent capital, with a probable local population of as much as 25,000-30,000 (Webster and Freter 1990; Webster, Sanders, and Van Rossum 1992). Yalbac's status as either capital of an independent polity or secondary center dependent on a capital elsewhere has not been resolved. Likewise, Yalbac's total population has not been estimated and there is no reason to believe it is as large as either Copán's or Tikal's. Despite these qualifications, the construction operations quantified in Yalbac's Acropolis fall within the range of elite construction projects at both Copán and Tikal. This would seem to suggest that for single construction operations, Yalbac's political leaders were sometimes able to extract a similar amount of labor from their subjects as the political elite at Copán or Tikal.

Beyond that, it is hard to draw comparisons. For example, the dynasts of Tikal and Copán, given the amount and scale of monumental construction at those centers, are probably more likely than Yalbac's political elite to have had several work crews working on different projects, with varying degrees of public and private functions, at the same time. On the other hand, if it can be shown that the Yalbac polity's population was significantly smaller than that of either Copán or Tikal, as

seems likely, it might turn out that Yalbac's rulers were able to extract more labor in terms of person-days *per capita* than were the rulers of those large sites. There are still too many unknowns in regard to Yalbac's political, social, and economic situations to do more than posit these possibilities here. No conclusions can yet be reached.

Interestingly, the major summit buildings built on the Yalbac Acropolis, Structures 1A-1a-I and 1A-1a-II, both presumably residential buildings, did not require as much labor to build as some of the non-royal residences in the Las Sepulturas Zone at Copán. These residences, such as the large 9N-82C, appear to have belonged to elite families whose power to extract labor may have eclipsed that of even rulers at smaller centers. Indeed, Group 9N-8 is barely less monumental in scale than the Late Classic palace of Copán, Group 10L-2. It has been suggested that this and similar buildings are indications of the growing decentralization of power and the waning of the Copán dynasty toward the end of the Classic Period (Webster, Freter, and Gonlin 2000; see Viel 1999 for an alternative explanation based on iconographic evidence). There has not been enough investigation outside of the site core at Yalbac yet to tell whether a similar decentralization may have occurred there, the only wealthy residential structure (Structure 94E22N-14) investigated so far does not compare in scale to the summit structures of the acropolis (Graebner and Lucero 2003), but Structure 94E22N-14 is not considered to be an elite residence. Based on such limited evidence, we cannot make any generalized comparisons to Copán case at the moment, except to say that the ability of some Late Classic non-royal elites at

Copán to procure labor for residential construction projects may have been equal to or even greater than the ability of the Yalbac elite to do so.

When it comes to the functions of the various acropoli at the three sites, there is no way to definitively account for differences evident between Yalbac and Copán and Tikal. As mentioned above, the primary function of the Copán Acropolis appears to have been as an elite ritual and mortuary complex. The same is likely true of the North Acropolis at Tikal (Coe 1988). Like the Central Acropolis at Tikal (Harrison 1970), the Yalbac Acropolis is likely to have combined administrative and residential functions (Graebner 2002b). These differences in acropolis function may simply be the result of historical accident, and thus be specific to each site. They may reflect regional differences in the perception of the proper function of an elevated acropolis-type structure. Another possibility is that they may reflect differences in acropolis function based on the different political and functional roles of each site within its polity. For example, it is possible that the presence of large residential acropoli without associated mortuary acropoli may be a common pattern found in secondary centers but not at polity capitals. Without more investigation and a greater understanding of the political situation at Yalbac and elsewhere in the Maya region, this amounts to little more than speculation.

The political elite at Yalbac who resided in the Structure 1A complex may have focused their attention on building a monumental palace acropolis because of the need to emphasize their difference from, and power over the local, non-elite population. At larger centers, like Tikal and Copán, powerful houses may have

needed to call attention not only to their political roles (through the construction of large palaces) but also to their roles in religious and ritual leadership (through the construction of large temples and mortuary complexes). At Yalbac, the emphasis of monumental construction is different, suggesting a different emphasis for elite statements about themselves and their role in society. This may explain the lack of a large mortuary acropolis and the size of the Yalbac Acropolis compared to other monumental architecture at the site, and the relatively large proportions of ritual and mortuary architecture observed at Tikal and Copán, including structures such as the Acropolis at Copán and the North Acropolis at Tikal.

There is no general pattern of acropolis growth among the three sites studied. Accretionary additions to acropolis substructures were undertaken intermittently. At Tikal and Copán, acropolis construction begins during the Early Classic, and continues irregularly through the Terminal Classic, when these centers undergo construction declines associated with the Classic Maya collapse (Culbert et al. 1990; Webster, Freter and Gonlin 2000). There is no reason to believe that this is not the pattern we see at Yalbac. The only tentative dates we have for acropolis construction, based on sherds recovered in LTs 14 and 17, likely place the final construction phase of the Yalbac Acropolis into the Spanish Lookout Phase. This phase lasts from about A.D. 700 to A.D. 900 (Gifford et al. 1976:46), from the end of the Late Classic into the Terminal Classic. This is consistent with the timing of the final periods of monumental construction elsewhere. If the Yalbac Acropolis does indeed date to or after the Late Facet of the Spanish Lookout Phase (ca. A.D. 800-900) then

construction at Yalbac may have continued to or even a little beyond the final epigraphic dates at Tikal (A.D. 869 [Rands 1973:51]) and the period when dynastic power ended at Copán (A.D. 810-822 [Fash, Andrews, and Manahan 2004:260; Webster, Freter, and Storey 2004: 234])). This would be consistent with the Terminal Classic florescence observed at the nearby Belizean site of Xunantunich (LeCount et al. 2002).

On the whole, current evidence appears to place Yalbac very much within the dates and patterns observed frequently across the Maya region. Excavations in Plazas 2 and 3 yielded diagnostic ceramics ranging in date from ca. 300 B.C. to A.D. 900 (Graebner 2002a). These dates would suggest a Late Preclassic to Terminal Classic range for the majority of occupation at the site. This is consistent with observed patterns throughout the Maya area (Sharer 1994; Culbert 1973; e.g. Culbert et al. 1990; Rice and Rice 1990). Significant additions were apparently made to the acropolis during the Late to Terminal Classic Spanish Lookout Phase. This is also consonant with patterns observed elsewhere as much Maya monumental construction is believed to date to around this time period (Sharer 1994; Andrews 1975). A cessation of building at the acropolis, which may have occurred during or shortly after the Late Facet of the Spanish Lookout Phase (ca. A.D. 800-900) places the end of new building at this structure within the time period usually thought of as the Classic Maya Collapse (Rands 1973). The possibility that large, labor-costly additions to the acropolis, such as the Courtyard 1A-1 platform and its summit structures, including Structure 1A-1a-I and Structure 1A-1a-II, date to this last phase

of the Classic Period may indicate a pattern like that observed at Xunantunich.

Overall indications are that the Terminal Classic and the Maya Collapse are far more varied events than scholars used to believe. Regional culture-histories are indicating that patterns of decline and collapse varied significantly across the Maya Lowlands (Demarest, Rice, and Rice 2004). Interestingly, Laporte (2004) claims that the Terminal Classic in the Maya Mountains of Guatemala's southeastern Petén was a time of political change, with many polity capitals declining and the ascendance of former secondary centers to regional control. The work of LeCount and her colleagues at Xunantunich suggests that similar upheavals may have been occurring in the Belize River valley as well (LeCount et al. 2002).

At that site, not far from Yalbac, significant modifications were made to monumental structures and new structures were built during the Terminal Classic. LeCount and her colleagues (2002) believe that this surge in construction, coupled with new sculptural monuments, such as Stela 1, indicates that Xunantunich was expanding at this time due to increased independence. They argue that the Terminal Classic period saw the decline of many regional capitals, allowing the secondary center of Xunantunich to create its own independent regional polity. It is impossible to tell if something like this could have happened at Yalbac, but the current evidence is consistent with this scenario. Certainly, the Yalbac ruling dynasty was still politically powerful enough to continue monumental building projects in a period when many larger Maya centers were in decline.

CHAPTER 12

CONCLUSIONS AND IMPLICATIONS

Conclusions

The issue of whether Yalbac's political situation—its power within whatever polity it formed a part of—changed over time cannot be resolved by this study. I thought, prior to carrying out this research, that rapid changes in acropolis size at the end of the Late Classic would indicate that the ruling family of Yalbac was experiencing increased independence, and therefore was able to exercise a greater deal of control over local labor resources. However, analysis of the data from Copán and Tikal shows that acropolis growth tends to be sporadic and unpredictable, apparently regardless of changes in the political structure of the polity. Occasionally large additions are made, but at other times, only small amount of architecture are built. The complexity of these patterns means that I cannot account for political (in terms of ability to extract labor) changes at Yalbac as a consequence of greater independence.

What can be said is that the ability of Yalbac's rulers to extract labor from their subjects is that at some times and for particular projects it was within the range of the amount of labor extracted for particular projects at Copán and Tikal. At Copán, though, even non-royal elites, such as those living in Group 9N-8 were able to extract similar amounts of labor, at least at times and for particular projects, for the construction of their residences. In comparison to Tikal, at least in regards to

construction on the North Acropolis, the amount of labor invested in building phases at Yalbac would probably fall into the low end of the range of investment in single projects.

At Yalbac, Tikal, and Copán, there are observable differences in the ratios of public to private construction. At the two larger sites, proportionally more labor was invested in presumably more public architectural complexes, such as ritual and mortuary complexes including Tikal's North Acropolis and the Acropolis at Copán. At Yalbac, the largest single structure is the Acropolis, a palace with a more private role. Proportionally less investment was made in ritual and mortuary complexes.

Bearing in mind the difficulty in distinguishing public from private domains, it is possible that the proportionally greater energetic investment represented by the Yalbac acropolis compared to palace complexes at Tikal and Copán may indicate differences in elite emphasis at each site. At the larger sites of Copán and Tikal, elites may have been required to invest more heavily in ritual structures in order to cement their religious leadership roles. At the secondary center of Yalbac, the emphasis may have been placed on palatial construction in order to emphasize the elite's role in local political leadership and the differences between them and local commoners.

On the whole, the information analyzed here seems to place Yalbac, politically, right where it is already believed to fall: it was a secondary center. If, as LeCount et al. (2002) hypothesize and Laporte (2004) discusses, major changes occurred in the Mopán/Belize River valley during the Terminal Classic, we cannot

yet say what part, if any, Yalbac played in those changes. It is believed that some major centers in the area were declining, with new—previously secondary—centers taking over as polity capitals. Yalbac may or may not have been one of those new, up-and-coming polities.

Implications

The most important contribution of this project to future research at Yalbac should be the brief synopsis of acropolis construction history presented. This may provide a starting point for future research into the history of monumental construction at Yalbac.

Beyond the local effects on research at Yalbac, I believe this project makes a valuable contribution to Maya-area archaeological methodology. The methods presented here, both for data recovery from looter's trenches, and for the analysis of that information based on the work of Abrams could be productively applied at other Maya sites. Looting is a well-known problem throughout the Maya area, and is prevalent in Belize (Pendergast and Graham 1981, 1989; Gutchen 1983). Looter's trenches are found at many, if not most, archaeological sites in the Maya Lowlands. For research projects which do not intend to conduct large-scale excavations, looter's trenches can provide useful information on monumental architecture. Even for major excavation projects, looter's trenches could be examined to provide data on structures which are not current excavation targets. In fact, many researchers have investigated looter's trenches (e.g. McGovern 1995, Schubert, Kaphandy, and Garber 2001). The

method followed here provides another useful avenue for interpreting such data.

In larger terms, this is intended as a contribution to the archaeological literature on labor procurement, energetics, and relationships of power. This is an effort to explore these concepts at Yalbac, based on the data obtained from looter's trenches. Despite the tentative nature of the conclusions reached, I believe that this is a meaningful contribution.

As discussed in the previous chapter, all conclusions regarding the political relationships of the Yalbac rulers and their ability to extract labor from their subjects have to remain tentative or put on hold altogether at this point. Hopefully, as our understanding of the role of Yalbac in the Maya world expands in coming years, this analysis can be reexamined in the light of new evidence. Perhaps then, we will be able to say more about what we know than about what we don't know.

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